SECTION 12 REPLACEMENT PARTS

Use only genuine Manufacturer replacement parts.

12.A General Information

To order or purchase parts for these high efficiency residential units, contact your nearest manufacturers dealer or distributor. See the back cover for the manufacturers website and information.

12.B Parts List

ITEM	DESCRIPTION	SIZE 80	SIZE 105	SIZE 150	SIZE 210
Jacket Components – *See Figure 41*					
1	Front Panel Assembly	R60D3200	R60D3200	R60D3200	R60D3200
2	Front Panel Handle	R50D3204	R50D3204	R50D3204	R50D3204
3	Rear Panel	R50D3101	R50D3101	R50D3101	R50D3101
4	Left Side Panel	R8D3002	R10D3002	R15D3002	R20D3002
5	Right Side Panel	R15D3001	R15D3001	R15D3001	R30D3001
6	Left Top Panel	8D3327	10D3327	R15D3303	R20D3303
7	Middle Left Top Panel	8D3328	10D3328	15D3402	20D3403
7A	Middle Right Top Panel	8D3329	10D3329	15D3403	20D3402
8	Right Top Panel	8D3330	10D3330	15D3401	R20D3301
9	Jacket Angle Support	R8D3102 (Right Hand) R15D3102 (Left Hand)	R8D3102 (Right Hand) R15D3102 (Left Hand)	R15D3102 (2)	R30D3102 (2)
10	Jacket Support, Left Stanchion	R50D3003	R50D3003	R50D3003	R50D3003
11	Jacket Support, Right Stanchion	R50D3004	R50D3004	R50D3004	R50D3004
12	Front Bezel	R50D7121	R50D7121	R50D7121	R50D7121
13	Display mounting frame	R50D7122	R50D7122	R50D7122	R50D7122
(12&13)	Complete Assembly	R50D7120	R50D7120	R50D7120	R50D7120
Internal Components – *See Figure 43*					
20	Base Assembly	R15D1100	R15D1100	R15D1100	R30D1100
21	Left Rear Support Stanchion	R50D1001	R50D1001	R50D1001	R50D1001
22	Left Front/Right Rear Support Stanchion	R50D1002	R50D1002	R50D1002	—
23	Cantilevered Base Stanchion	R15D1002	R15D1002	R15D1002	R40D1001
24	Brace, Front, HX Stanchion	20D1005	20D1005	20D1005	20D1005
24A	Brace, Rear, HX Stanchion	R50D1005	R50D1005	20D1007	20D1007
25	Mounting Rail	R15D1004	R15D1004	R15D1004	R30D1004
27	Condensate Trap Assy	R20D4020	R20D4020	R20D4020	R20D4020
28	Heat Exch. Rail Clip	R50D1006 (2)	R50D1006 (2)	—	—

ITEM	DESCRIPTION	SIZE 80	SIZE 105	SIZE 150	SIZE 210
30	PVC Reducer	—	—	RP2053000	RP2053000
30a	CPVC Reducer or Coupling	RD2010501	RD2010501	RP2065600	RP2065600
30b	2” Dia. Pipe, CPVC	RD2010212	RD2010212	RD2010213	RD2010213
31	Hose Barbed Adapter	RP2067100	RP2067100	RP2056100	RP2056100
33	Air Inlet/Exhaust Bracket	R8D3005	10D3005	R20D3120	R20D3120
	Gas Train Components – *See Figure 42*				
40	Combustion Air Blower	RA2113700	RA2113700	RA2107500	RA2114200
41	Gas Valve/Venturi	RV2017900	RV2017901	RV2017902	RV2017903
42	On/Off Rectifier Module	E2324300	E2324300	E2324300	E2324300
47	Gas Valve O-Ring	R30-227	R30-227	R30-227	R30-227
51	Duct/Venturi Transition	R10D5021	R10D5021	R10D5021	R10D5013
52	Gas Supply Pipe	RP2051700	RP2051400	RP2051400	RP2051400
55	Air Inlet Flex Hose	D0091403	RD0091403	RD0091403	D0091401
	Heat Exchanger Components – *See Figure 44*				
60	Heat Exchanger	RS2106900	RS2105500	RS2105800	RS2105700
61	Pump Assembly	R8D4110	R10D4110	R10D4110	R20D4140
62	Low Water Cutoff Switch	—	—	—	—
63	Inlet Water Temp Sensor	RE2320600	RE2320600	RE2320600	RE2320600
64	Duplex Outlet Water Temperature Sensor	RE2319900	RE2319900	RE2319900	RE2319900
65	Duplex Stack Temperature Sensor	RE2319700	RE2319700	RE2319700	RE2319700
66	Pressure Relief Valve, Boiler	R51-182 (30 PSI)	R51-182 (30 PSI)	R51-182 (30 PSI)	R51-182 (30 PSI)
	Pressure Relief Valve,			A2114802 (125 PSI)	A2114802 (125 PSI)
67	Air Vent	R1-592	R1-592	R1-592	R1-592
68	Burner Door w/gasket	RS2112801	RS2112801	RS2112801	RS2112801
68A	Burner Door Gasket (rubber)	R2069400	R2069400	R2069400	R2069400
69	Burner Gasket	RS2108500	RS2108500	RS2108500	RS2108500
69A	Gasket Set (burner gasket, ignitor gasket, sensor gasket & burner door gasket)	RS2109100	RS2109100	RS2109100	RS2109100
70	Front Refractory Tile	RT2109001	RT2109001	RT2109001	RT2109001
71	Rear Refractory Tile	R50D2021	R50D2021	R50D2021	R50D2021
72	Main Burner w/gasket	R2069101	R2069102	R2069103	R2069104
73	Flame Sensor w/gasket	R2069200	R2069200	R2069200	R2069200
74	Ignitor w/gasket	R2069300	R2069300	R2069300	R2069300
74A	Ignitor Gasket	RW2013300	RW2013300	RW2013300	RW2013300
74B	Screw, Ignitor/ Flame Sensor	m4-.7X8mm S2112700	m4-.7X8mm S2112700	m4-.7X8mm S2112700	m4-.7X8mm S2112700
74C	Flame/Sensor Gasket	RW2013400	RW2013400	RW2013400	RW2013400

ITEM	DESCRIPTION	SIZE 80	SIZE 105	SIZE 150	SIZE 210
75	Air/Gas Channel (80-600) Air Adapter (750-850)	RS2108400	RS2108600	RS2108600	RS2108700
75A	Screw, Air/Gas Channel	RS2109400 (5)	RS2109400 (5)	RS2109400 (5)	RS2109400 (5)
76	Drain	R10-143	R10-143	R10-143	R10-143
77	Sight Glass	R50D2020	R50D2020	R50D2020	R50D2020
	Electrical Components – *See Figure 45*				
80	Control Panel Enclosure	R50D7001	R50D7001	R50D7001	R50D7001
81	Transformer	RE2108700	RE2108700	RE2108700	RE2108700
82	High Voltage Shield	R50D7002	R50D7002	R50D7002	R50D7002
83	Top Panel Bracket	R50D7003	R50D7003	R50D7003	R50D7003
84	Electronic Control Module, Standard	*Contact Customer Service at 800 900-9276 x11*			
84	Electronic Control Module, CSD-1	*Contact Customer Service at 800 900-9276 x11*			
85	Rocker Switch	RE2322700	RE2322700	RE2322700	RE2322700
86	Control Display	RE2347200	RE2347200	RE2347200	RE2347200
87	Wire Harness	R50D7412	R50D7412	R50D7412	R50D7414
89	Air Pressure Switch	RE2334700	RE2334700	RE2334700	RE2334701

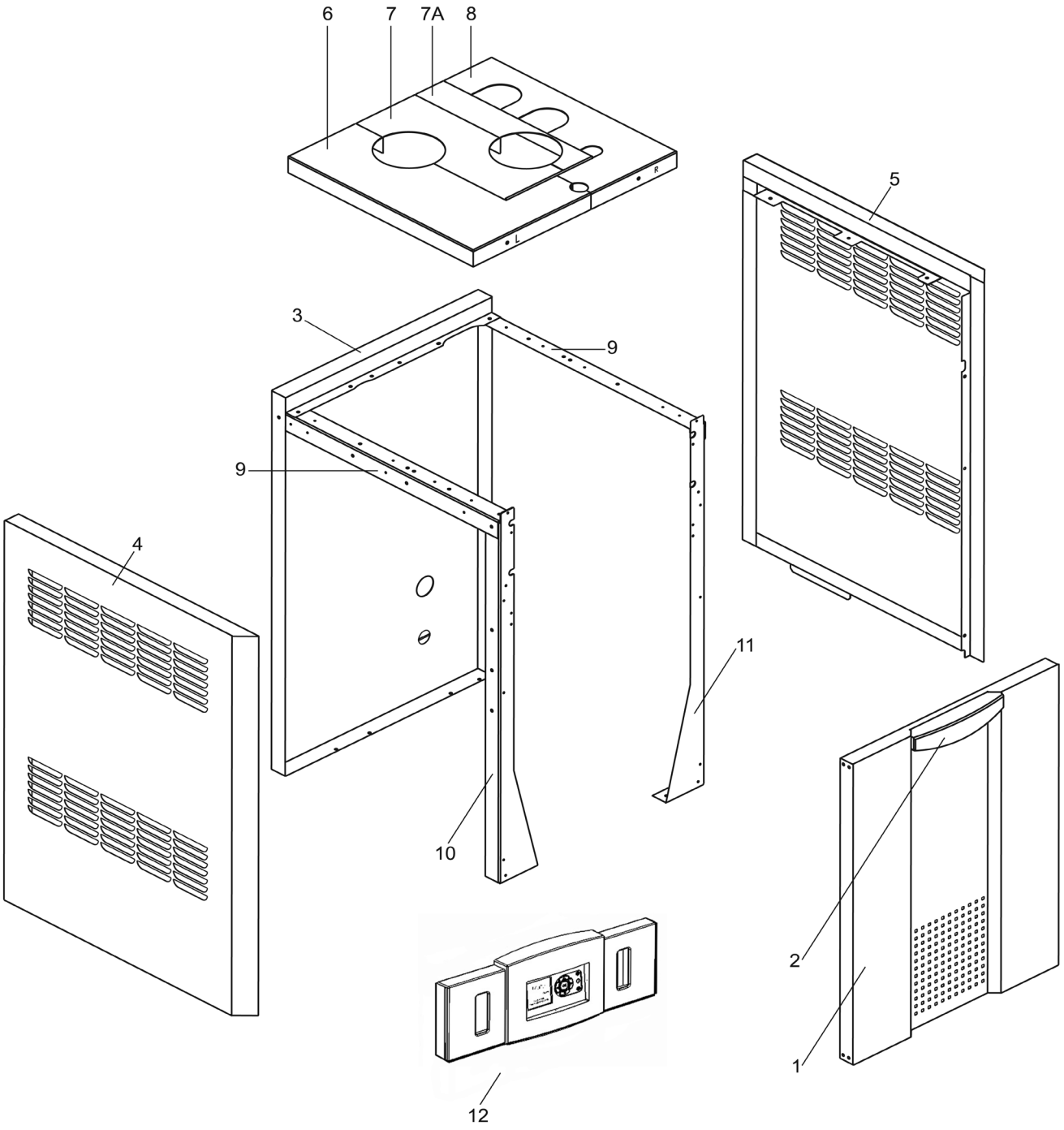
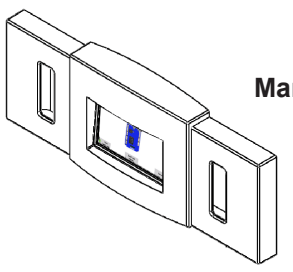
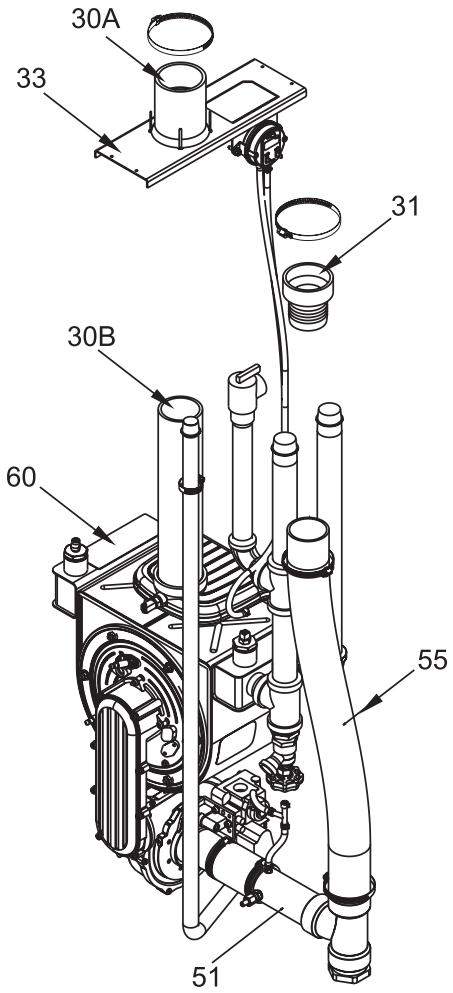


Figure 41. - Jacket Components

Optional Touchscreen User Interface Kit (KM50D7130)

Call your local Manufacturers Rep.





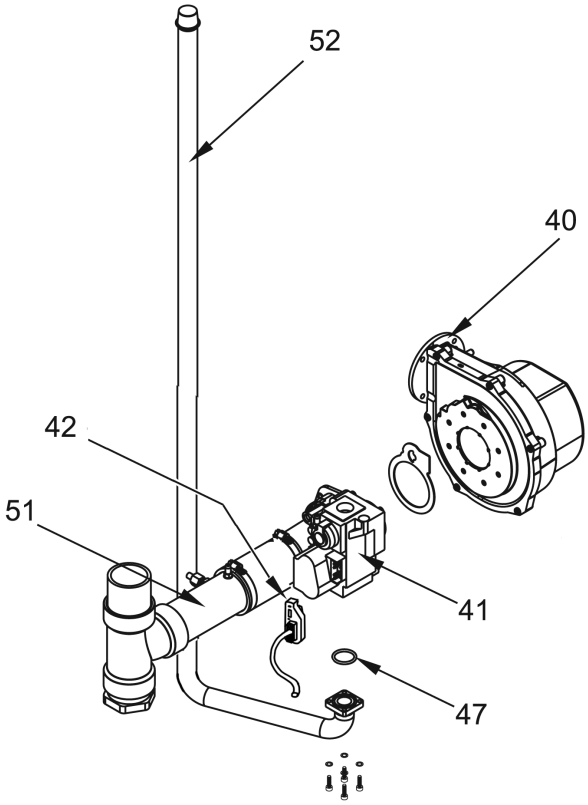


Figure 42. - Gas Train Components, Sizes 80-210

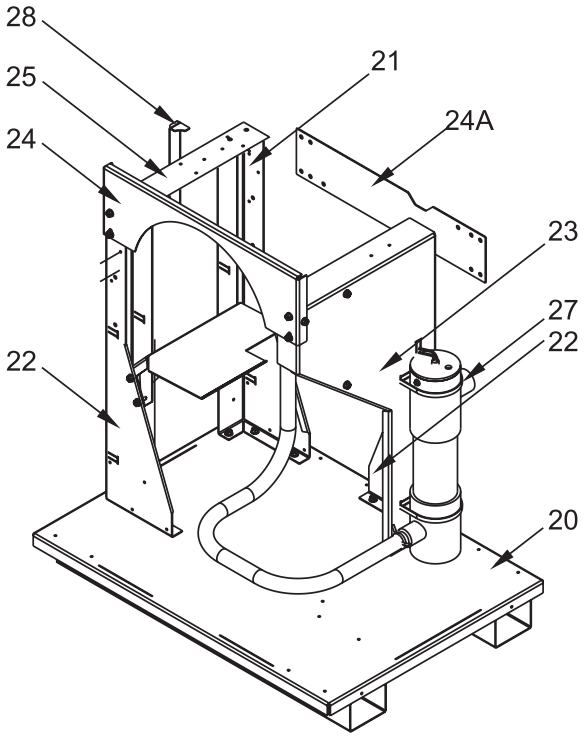


Figure 43. - Internal Components, Sizes 80–210

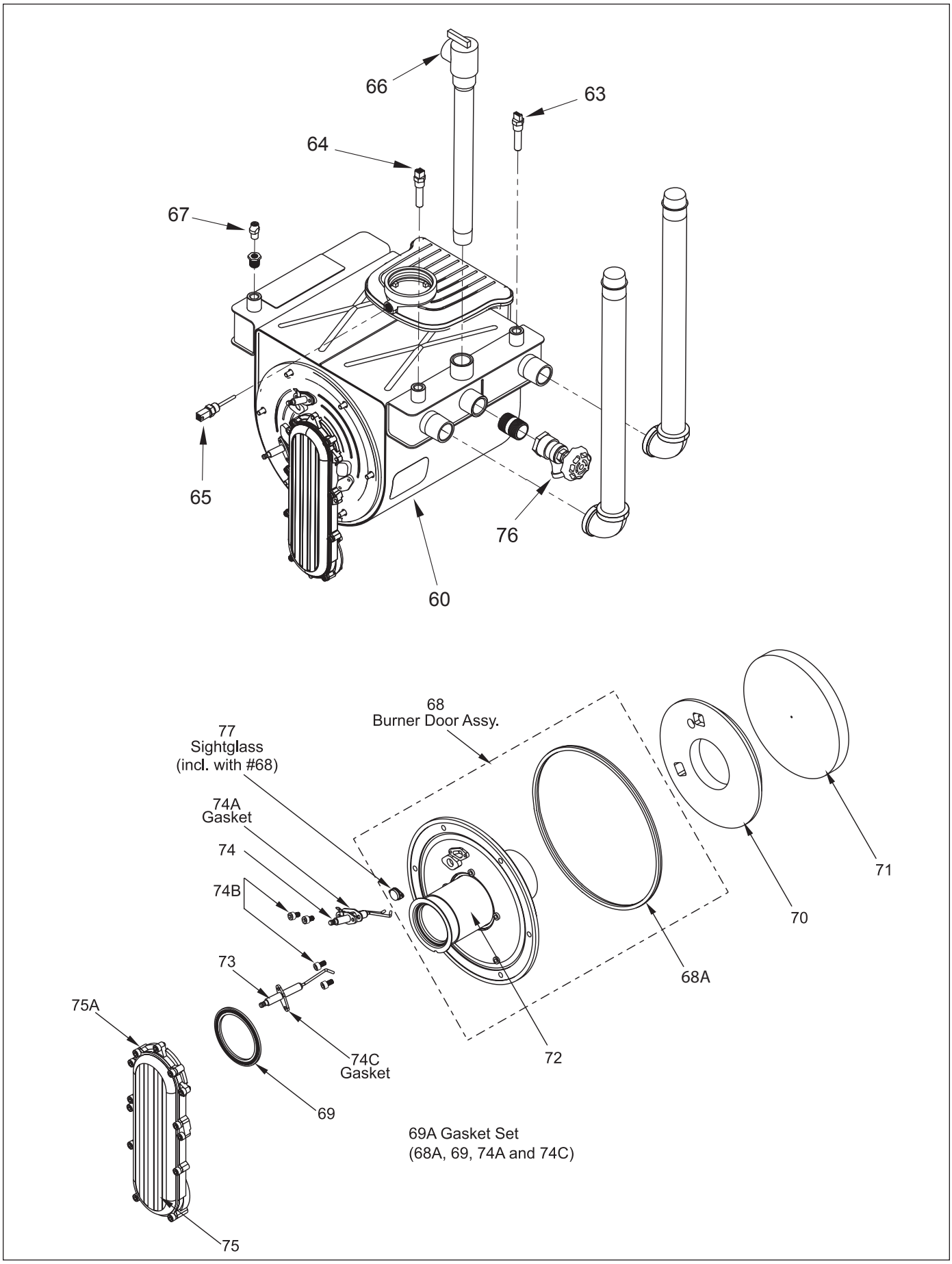


Figure 44. - Heat Exchanger Components

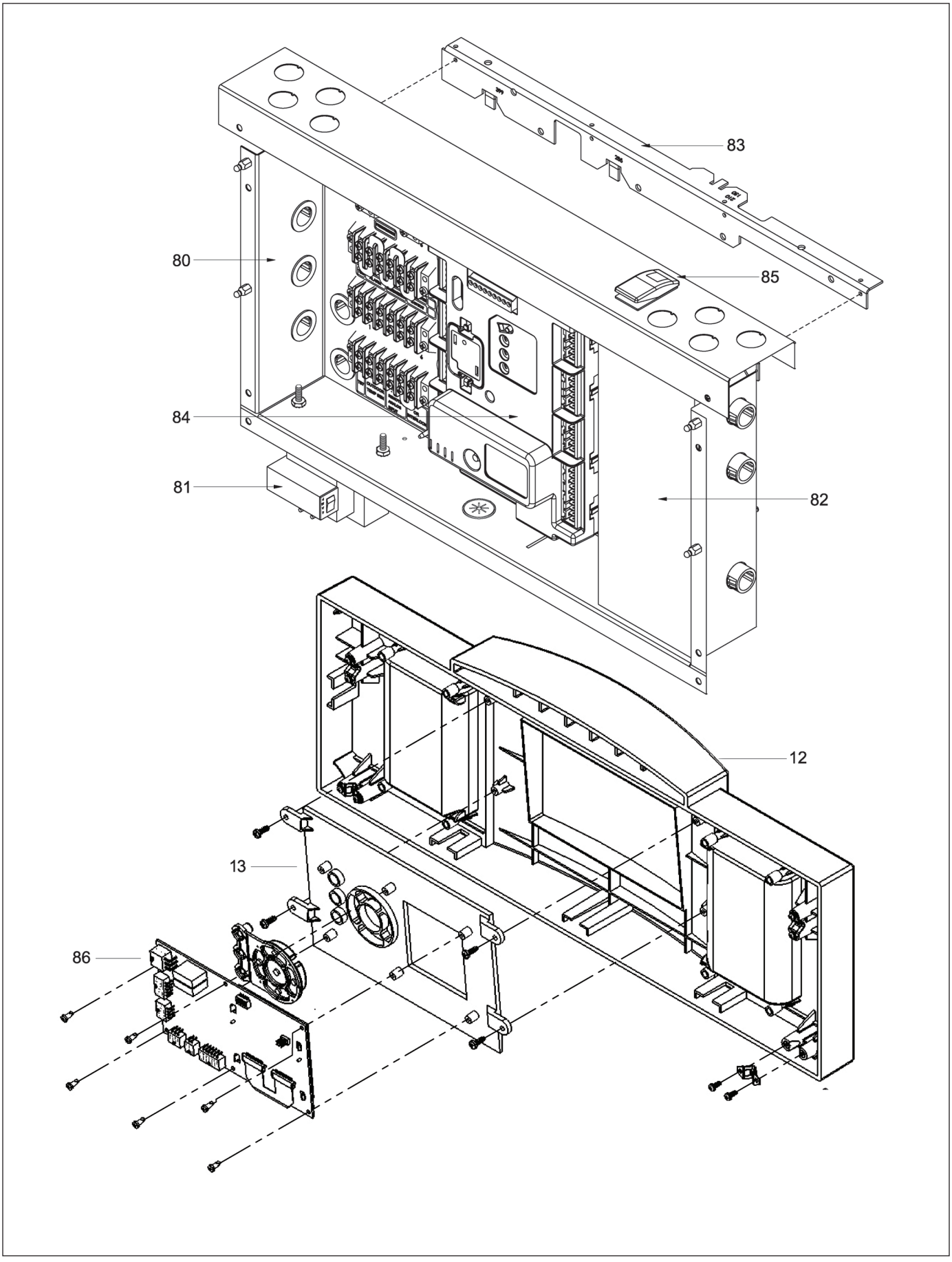


Figure 45. - Electrical Components

APPENDIX A
SOFTWARE CONTROL FUNCTIONS

This table includes a listing of all of the control functions that can be used by the operator or installer. Functions that require a password are indicated in the second column.

Name	PW?	Function	How to get there
Adjustable high limit	Y	The absolute high limit for the water outlet is pre-set at the factory. If desired, you can set a lower value here.	Quick Start
Adjustable stack limit	Y	The absolute high limit for the stack temperature is pre-set at the factory. If desired, you can set a lower value here.	Quick Start
Alert log	-	This displays the 15 most recent alerts.	Info/ Diagnostics/ History
Analog sensors	-	This shows the current condition of selected sensors – temperatures, fan speed, flame signal, etc.	Info/ Diagnostics
Anti short-cycle time	-	This feature can be set to prevent the burner from firing and then shutting off quickly in response to a call for heat that changes state quickly.	Info/ Advanced Setup/ System Config./ System Config.
Base load common rate (LL)	-	When using the Lead/ Lag system to control multiple boilers – As the heating load increases, this value sets the point where the controller will fire the next boiler. See the section on “About Lead/ Lag.”	Info/ Advanced Setup/ Lead Lag Configuration/ LL Master Config.
Boiler pump control	Y	The boiler pump can be turned on manually, or it can be set to operate automatically.	Info/ Test/ Manual Pump Operation Info/ Advanced Setup/ System Config./ Pump Config.
Boiler pump cycle count	Y	A new value can be written here if the pump or controller is replaced.	Info/ Advanced Setup/ System Config./ Statistics Config.
Boiler pump overrun time	Y	This indicates how long the boiler pump will remain on after demand from any source ends.	Info/ Advanced Setup/ System Config./ Pump Config.
Burner cycle count	Y	This is incremented on each entry to Run. A new value can be written here if the burner or controller is replaced.	Info/ Advanced Setup/ System Config./ Statistics Config.
Burner name	Y	This parameter allows the installer to give each boiler unit a unique name.	Info/ Advanced Setup/ System Config./ System ID and Access
Burner off inhibit time	Y	Set to “No Value.”	Info/ Advanced Setup/ System Config./ System Config.
Burner run time	Y	This measures the time spent in the Run state. A new value can be written here if the burner or controller is replaced.	Info/ Advanced Setup/ System Config./ Statistics Config.
CH setpoint	-	This setpoint is used to control the hydronic (Central Heat) function.	Quick Start Info/ Advanced Setup/ CH Configuration
D gain (CH)	Y	This gain is applied to the Differential term of the PID equation for the CH loop.	Info/ Advanced Setup/ CH Configuration
D gain (DHW)	Y	This gain is applied to the Differential term of the PID equation for the DHW loop.	Info/ Advanced Setup/ DHW Configuration
D gain (LL)	Y	When using the Lead/ Lag system to control multiple boilers – This gain is applied to the Differential term of the PID equation for the hydronic heating loop.	Info/ Advanced Setup/ Lead Lag Configuration/ LL Master Config.

Name	PW?	Function	How to get there
Demand switch (CH)	-	Set to “STAT terminal.”	Info/ Advanced Setup/ CH Configuration
DHW pump control	Y	The boiler pump can be turned on manually, or it can be set to operate automatically.	Info/ Test/ Manual Pump Operation
			Info/ Advanced Setup/ System Config./ Pump Config.
DHW pump cycle count	Y	A new value can be written here if the pump or controller is replaced.	Info/ Advanced Setup/ System Config./ Statistics Config.
DHW pump overrun time	Y	This indicates how long the DHW pump will remain on after demand from any source ends.	Info/ Advanced Setup/ System Config./ Pump Config.
DHW setpoint	-	This setpoint is used to control the Domestic Hot Water function.	Quick Start
			Info/ Advanced Setup/ DHW Configuration
Digital I/O	-	This shows the status of selected switches and valves that are either On or Off.	Info/ Diagnostics
Display setup	-	Use this to change the lines that appear at the top of the Home display, and to set the brightness of the display.	Info/ Display Setup
General configuration	-	Used by the Manufacturer factory.	Info/ Advanced Setup/ System Config./ System Config.
I gain (CH)	Y	This gain is applied to the Integral term of the PID equation for the CH loop.	Info/ Advanced Setup/ CH Configuration
I gain (DHW)	Y	This gain is applied to the Integral term of the PID equation for the DHW loop.	Info/ Advanced Setup/ DHW Configuration
I gain (LL)	Y	When using the Lead/ Lag system to control multiple boilers – This gain is applied to the Integral term of the PID equation for the hydronic heating loop.	Info/ Advanced Setup/ Lead Lag Configuration/ LL Master Config.
Installer password	Y	This can only be changed by a user with the OEM-level password.	Info/ Advanced Setup/ System Config./ System ID and Access
LCD contrast	-	Use this to change the brightness of the display.	Info/ Display Setup
Lockout history	-	This displays the 15 most recent lockouts.	Info/ Diagnostics/ History
Low water temp. (CH)	-	Used with Outdoor Reset – Above the point where Outdoor Reset stops adjusting for a higher outdoor temperature (the Max. Outdoor Temperature value), this parameter is used as the setpoint.	Quick Start Info/ Advanced Setup/ CH Configuration/ Outdoor Reset Config.
Low water temp. (LL)	-	When using the Lead/ Lag system to control multiple boilers, with Outdoor Reset enabled – Above the point where Outdoor Reset stops adjusting for a higher outdoor temperature (the Max. Outdoor Temperature value), this parameter is used as the setpoint.	Info/ Advanced Setup/ Lead Lag Configuration/ LL Outdoor Reset
Manual burner operation	Y	During testing, use this to turn the burner on and off.	Info/ Test
Master enable (LL)	-	When using the Lead/ Lag system to control multiple boilers – One of the controllers must be set up as the Lead Lag Master to supervise the Lead Lag system. The master function must be disabled on all of the other controllers. See the section on “About Lead Lag.”	Info/ Advanced Setup/ Lead Lag Configuration/ LL Master Config.

Name	PW?	Function	How to get there
Max. outdoor temp. (CH)	-	Used with Outdoor Reset – This is the maximum outdoor temperature at which the Outdoor Reset feature will be active. Above this point, the Low Water Temp. will be used as the setpoint.	Quick Start Info/ Advanced Setup/ CH Configuration/ Outdoor Reset Config.
Max. outdoor temp. (LL)	-	When using the Lead/ Lag system to control multiple boilers, with Outdoor Reset enabled – This is the maximum outdoor temperature at which the Outdoor Reset feature will be active.	Info/ Advanced Setup/ Lead Lag Configuration/ LL Outdoor Reset
MB1 Modbus address	-	Allows for a specific address assignment for each control in the system (1-8).	Info/ Advanced Setup/ System Config./ System ID and Access
MB2 Modbus address	-	Allows for a specific address assignment for each control in the system (1-8).	Info/ Advanced Setup/ System Config./ System ID and Access
Min. boiler water temp. (CH)	-	Used with Outdoor Reset – If a value is entered here, the temperature in the boiler will never be allowed to drop below this temperature. This will protect the boiler against possible damage due to expansion of ice inside the unit. (Notice that this is different from the “Low Water Temperature” described above.)	Info/ Advanced Setup/ CH Configuration/ Outdoor Reset Config.
Min. outdoor temp. (CH)	-	Used with Outdoor Reset – This is the maximum outdoor temperature at which the Outdoor Reset feature will be active. Below this point, the system will use the normal CH setpoint.	Quick Start Info/ Advanced Setup/ CH Configuration/ Outdoor Reset Config.
Min. outdoor temp. (LL)	-	When using the Lead/ Lag system to control multiple boilers, with Outdoor Reset enabled – This is the maximum outdoor temperature at which the Outdoor Reset feature will be active. Below this point, the system will use the normal LL setpoint.	Info/ Advanced Setup/ Lead Lag Configuration/ LL Outdoor Reset
Min. water temp. (LL)	-	When using the Lead/ Lag system to control multiple boilers, with Outdoor Reset enabled – If a value is entered here, the temperature in the boiler will never be allowed to drop below this temperature. This will protect the boiler against possible damage due to expansion of ice inside the unit. (Notice that this is different from the “Low Water Temperature” described above.)	Info/ Advanced Setup/ Lead Lag Configuration/ LL Outdoor Reset
Modbus address	-	When using the Lead/ Lag system to control multiple boilers – Each controller must have a unique Modbus address.	Info/ Advanced Setup/ System Config./ System ID and Access
Modulation sensor	-	Used with external modulation control – The choices are Outlet/ Inlet/ S5, S10, and None.	Info/ Advanced Setup/ CH Configuration
OEM ID	Y	Cannot be changed by the Installer.	Info/ Advanced Setup/ System Config./ System ID and Access
OEM password	Y	Cannot be changed by the installer.	Info/ Advanced Setup/ System Config./ System ID and Access
Off hysteresis (CH)	-	For hydronic heating (Central Heat) – The control system will not shut off the boiler until the temperature at the System sensor rises to the CH setpoint plus a hysteresis value (normally about 10°F).	Info/ Advanced Setup/ CH Configuration

Name	PW?	Function	How to get there
Off hysteresis (DHW)	-	When producing Domestic Hot Water – The control system will not shut off the boiler until the temperature at the System sensor rises to the DHW setpoint plus a hysteresis value (normally about 10°F).	Info/ Advanced Setup/ DHW Configuration
Off hysteresis (LL)	-	When using the Lead/ Lag system to control multiple boilers – The control system will not shut off the boilers until the temperature at the System sensor rises to the Lead Lag CH setpoint plus a hysteresis value (normally about 10°F).	Info/ Advanced Setup/ Lead Lag Configuration/ LL Master Config.
On hysteresis (CH)	-	For hydronic heating (Central Heat) – The control system will not fire the boiler until the temperature at the System sensor drops to the CH setpoint minus a hysteresis value (normally about 10°F).	Info/ Advanced Setup/ CH Configuration
On hysteresis (DHW)	-	When producing Domestic Hot Water – The control system will not fire the boiler until the temperature at the System sensor drops to the DHW setpoint minus a hysteresis value (normally about 10°F).	Info/ Advanced Setup/ DHW Configuration
On hysteresis (LL)	-	When using the Lead/ Lag system to control multiple boilers – The control system will not fire the boilers until the temperature at the System sensor drops to the Lead Lag CH setpoint minus a hysteresis value (normally about 10°F).	Info/ Advanced Setup/ Lead Lag Configuration/ LL Master Config.
Outdoor reset (CH)	-	Enable = Outdoor Reset feature turned on	Quick Start Info/ Advanced Setup/ CH Configuration/ Outdoor Reset Config.
Outdoor reset enable (LL)	-	When using the Lead/ Lag system to control multiple boilers – Enable = Outdoor Reset feature turned on	Info/ Advanced Setup/ Lead Lag Configuration/ LL Outdoor Reset
P gain (CH)	Y	This gain is applied to the Proportional term of the PID equation for the hydronic (Central Heat) loop.	Info/ Advanced Setup/ CH Configuration
P gain (DHW)	Y	This gain is applied to the Proportional term of the PID equation for the Domestic Hot Water loop.	Info/ Advanced Setup/ DHW Configuration
P gain (LL)	Y	When using the Lead/ Lag system to control multiple boilers – This gain is applied to the Proportional term of the PID equation for the hydronic loop.	Info/ Advanced Setup/ Lead Lag Configuration/ LL Master Config.
Priority time	Y	If this parameter is non-zero, then a Domestic Hot Water demand takes priority over other demand sources for the specified time. The priority override timing is reset when demand from the DHW source turns off.	Info/ Advanced Setup/ DHW Configuration
Priority vs Central Heat	Y	If a CH call and a DHW call arrive at the same time, which has priority?	Info/ Advanced Setup/ DHW Configuration
Priority vs Lead Lag	Y	When using the Lead/ Lag system to control multiple boilers – If a call for hydronic heat and a DHW call arrive at the same time, which has priority?	Info/ Advanced Setup/ DHW Configuration

Name	PW?	Function	How to get there
Pump exercise interval	Y	The system can be set to exercise the pumps at set intervals. Enter a non-zero value to turn on the function.	Info/ Advanced Setup/ System Config./ Pump Config.
Pump exercise time	Y	If the pump exercise feature is enabled, this value sets the length of time that each pump will be exercised.	Info/ Advanced Setup/ System Config./ Pump Config.
Set high fire	Y	This is used during combustion setup to set the “high fire” condition.	Info/ Test/ Forced Rate
Set low fire	Y	This is used during combustion setup to set the “low fire” condition.	Info/ Test/ Forced Rate
Setpoint (LL)	-	When using the Lead/ Lag system to control multiple boilers – This setpoint is used to control the hydronic (Central Heat) function.	Info/ Advanced Setup/ Lead Lag Configuration/ LL Master Config.
Setpoint source (CH)	Y	Set to “Local.”	Info/ Advanced Setup/ CH Configuration
Setpoint source (LL)	Y	When using the Lead/ Lag system to control multiple boilers – Set to “Local.”	Info/ Advanced Setup/ Lead Lag Configuration/ LL Master Config.
Follower enable (LL)	-	When using the Lead/ Lag system to control multiple boilers – One of the controllers must be set up as the Lead Lag Master to supervise the Lead Lag system. The controllers on all of the other boilers must be enabled as Followers. See the section on “About Lead Lag.” The choices are: Disable/ Enable via Modbus Master/ Enable via SOLA Master	Info/ Advanced Setup/ Lead Lag Configuration/ LL Follower Config.
Follower mode (LL)	Y	When using the Lead/ Lag system to control multiple boilers – Set to “Equal Run Time.”	Info/ Advanced Setup/ Lead Lag Configuration/ LL Follower Config.
Start test	Y	This is used during combustion setup to start the test firing.	Info/ Test
System pump control	Y	The System pump can be turned on manually, or it can be set to operate automatically.	Info/ Test/ Manual Pump Operation Info/ Advanced Setup/ System Config./ Pump Config.
System pump overrun time	Y	This indicates how long the System pump will remain on after demand from any source ends.	Info/ Advanced Setup/ System Config./ Pump Config.
Temperature units	-	Fahrenheit or Celsius	Info/ Advanced Setup/ System Config./ System Config.
Warm weather shutdown	Y	The system can be set to shut down if the outdoor temperature rises above a certain value.	Info/ Advanced Setup/ CH Configuration/ Warm Weather Shutdown
Warm weather shutdown setpoint	-	If warm weather shutdown is enabled – If the outdoor temperature is higher than this value, the system will be shut off for Central Heating functions.	Info/ Advanced Setup/ CH Configuration/ Warm Weather Shutdown

APPENDIX B
ERROR MESSAGES

This table includes a listing of the faults that might be generated by the controller, and displayed on the Operator Interface. Some of these can be corrected by an installer changing a parameter, while other conditions are more complicated, and will require a service technician.

The first column lists the code number that will appear at the beginning of the Lockout or Hold message. The second column lists a short description of the condition. The third column shows whether the condition will cause a Hold, or Lockout, or both. The fourth column lists some suggestions for corrective action.

Code	Description	L or H	Procedure
1	Unconfigured safety data	L	1. New device, complete device configuration and safety verification. 2. If fault repeats, replace module.
2.	Waiting for safety data verification	L	1. Device in Configuration mode and safety parameters need verification and a device needs reset to complete verification. 2. Configuration ended without verification, re enter configuration, verify safety. parameters and reset device to complete verification. 3. If fault repeats, replace module.
3	Internal fault: Hardware fault	H	Internal fault 1. Reset module 2. If fault repeats, replace module.
4	Internal fault: Safety Relay key feedback error	H	
5	Internal fault: Unstable power (DC) output	H	
6	Internal fault: Invalid processor clock	H	
7	Internal fault: Safety relay drive error	H	
8	Internal fault: Zero crossing not detected	H	
9	Internal fault: Flame bias out of range	H	
10	Internal fault: Invalid burner control state	L	
11	Internal fault: Invalid burner control state flag	L	
12	Internal fault: Safety relay drive cap short	H	
13	Internal fault: PII (Pre-Ignition Interlock) shorted to ILK (Interlock)	H or L	
15	Internal fault: Safety relay test failed due to feedback ON	L	
16	Internal fault: Safety relay test failed due to safety relay OFF	L	

17	Internal fault: Safety relay test failed due to safety relay not OFF	L	Internal fault 1. Reset module 2. If fault repeats, replace module.
18	Internal fault: Safety relay test failed due to feedback not ON	L	
19	Internal fault: Safety RAM write	L	
20	Internal fault: Internal fault: Flame ripple and overflow	H	
21	Internal fault: Flame number of sample mismatch	H	
22	Internal fault: Flame bias out of range	H	
23	Internal fault: Bias changed since heating cycle starts	H	
24	Internal fault: Spark voltage stuck low or high	H	
25	Internal fault: Spark voltage changed too much during flame sensing time	H	
26	Internal fault: Static flame ripple	H	
27	Internal fault: Flame rod shorted to ground detected	H	
28	Internal fault: A/D linearity test fails	H	
29	Internal fault: Flame bias cannot be set in range	H	
30	Internal fault: Flame bias shorted to adjacent pin	H	
31	Internal fault: SLO electronics unknown error	H	
32-46	Internal fault: Safety Key 0 through 14	L	
47	Flame Rod to ground leakage	H	
48	Static flame (not flickering)	H	
49	24 VAC voltage low/high	H	1. Check the module and display connections. 2. Check the module power supply and make sure that frequency, voltage and VA meet the specifications.
50	Modulation fault	H	Internal sub-system fault. 1. Review alert messages for possible trends. 2. Correct possible problems. Internal sub-system fault.
51	Pump fault	H	
52	Motor tachometer fault	H	

53	AC input phases reversed	L	1. Check the module and display connections. 2. Check the module power supply and make sure that both frequency and voltage meet the specifications. 3. On 24 VAC applications, assure that J4 terminal 10 and J8 terminal 2 are connected together.
59	Internal Fault: Mux pin shorted	L	Internal Fault. 1. Reset module. 2. If fault repeats, replace module.
61	Anti short cycle	H	Will not be a lockout fault. Hold Only.
62	Fan speed not proved	H	Will not be a lockout fault. Hold Only.
63	SAFETY CHAIN (OFF) To diagnose, test all of the following safety devices if they are installed: Condensate Level Switch – All Models Heat Exchanger Fusible Link – All Models Optional Flow Switch Additional High Limit (Field Supplied) Optional Pressure Switch Optional Low Water Cut Off Low Pressure gas switch – Inlet Side of Gas Valve (Standard Equipment on CSD-1 Models) High Pressure gas switch – Outlet Side of Gas Valve (Standard Equipment on CSD-1 Models)	H	1. Reset the low gas pressure valve and the high gas pressure valve. 2. Check for power at Terminal Block 8 (TB8 for the 'Safety Chain' components. See Figure 16 on page 27 3. Check wiring and correct any faults. 4. Check all safety interlocks connected to the safety circuit to assure proper function. 5. If code persists, contact Tech Support.
64	PII (Pre-Ignition Interlock) OFF	H or L	1. Check wiring and correct any faults. 2. Check Preignition Interlock switches to assure proper functioning. 3. Check the valve operation. 4. Reset and sequence the module; monitor the PII status. 5. If code persists, replace the module.
67	ILK (Interlock) OFF	H or L	1. Check wiring and correct any possible shorts. 2. Check Interlock (ILK) switches to assure proper function. 3. Verify voltage through the interlock string to the interlock input with a voltmeter. 4. If steps 1-3 are correct and the fault persists, replace the module.
68	ILK (Interlock) ON	H or L	
70	Wait for leakage test completion	H	1. Internal Fault. Reset module. 2. If fault repeats, replace module.
78	Demand Lost in Run	H	1. Check wiring and correct any possible errors. 2. If previous steps are correct and fault persists, replace the module.
79	Outlet high limit	H or L	1. Check wiring and correct any possible errors. 2. Replace the outlet high limit. 3. If previous steps are correct and fault persists, replace the module.

80	DHW (Domestic Hot Water) high limit	H or L	1. Check wiring and correct any possible errors. 2. Replace the DHW high limit. 3. If previous steps are correct and fault persists, replace the module.
81	Delta T limit	H or L	1. Check inlet and outlet sensors and pump circuits for proper operation. 2. Recheck the Delta T Limit to confirm proper setting. 3. If previous steps are correct and fault persists, replace the module.
82	Stack limit	H or L	1. Check wiring and correct any possible errors. 2. Replace the Stack high limit. 3. If previous steps are correct and fault persists, replace the module.
91	Inlet sensor fault	H	1. Check wiring and correct any possible errors. 2. Replace the Inlet sensor. 3. If previous steps are correct and fault persists, replace the module.
92	Outlet sensor fault	H	1. Check wiring and correct any possible errors. 2. Replace the Outlet sensor. 3. If previous steps are correct and fault persists, replace the module.
93	DHW (Domestic Hot Water) sensor fault	H	1. Check wiring and correct any possible errors. 2. Replace the DHW sensor. 3. If previous steps are correct and fault persists, replace the module.
94	Header sensor fault	H	1. Check wiring and correct any possible errors. 2. Replace the header sensor. 3. If previous steps are correct and fault persists, replace the module.
95	Stack sensor fault	H	1. Check wiring and correct any possible errors. 2. Replace the stack sensor. 3. If previous steps are correct and fault persists, replace the module.
96	Outdoor sensor fault	H	1. Check wiring and correct any possible errors. 2. Replace the outdoor sensor. 3. If previous steps are correct and fault persists, replace the module.
97	Internal Fault: A2D mismatch.	L	Internal Fault. 1. Reset module. 2. If fault repeats, replace module.
98	Internal Fault: Exceeded VSNSR voltage tolerance	L	
99	Internal Fault: Exceeded 28V voltage tolerance	L	
100	Pressure Sensor Fault	H	1. Verify the pressure sensor is a 4-20 mA source. 2. Check wiring and correct any possible errors. 3. Test the pressure sensor for correct operation. 4. Replace the pressure sensor. 5. If previous steps are correct and fault persists, replace the module.

105	Flame detected out of sequence	H or L	1. Check that flame is not present in the combustion chamber. Correct any errors. 2. Make sure that the flame detector is wired to the correct terminal. 3. Make sure the F & G wires are protected from stray noise pickup. 4. Reset and sequence the module. If code reappears, replace the flame detector. 5. Reset and sequence the module. If code reappears, replace the module.
106	Flame lost in MFEP	L	1. Check the main valve wiring and operation - correct any errors. 2. Check the fuel supply. 3. Check fuel pressure and repeat turndown tests. 4. Check ignition transformer electrode, flame detector, flame detector siting or flame rod position. 5. If steps 1 through 4 are correct and the fault persists, replace the module.
107	Flame lost early in run	L	
108	Flame lost in run	L	
109	Ignition failed	L	
110	Ignition failure occurred	H	Hold time of recycle and hold option. Will not be a lockout fault. Hold only. Internal hardware test. Not a lockout.
111	Flame current lower than weak threshold	H	
113	Flame circuit timeout	L	Flame sensed during initiate or off cycle. Produces a Hold for 240 seconds. If still present after 240 seconds, system will lockout.
122	Lightoff rate proving failed	L	1. Check wiring and correct any potential wiring errors. 2. Check VFD's (Variable-speed Fan Drive) ability to change speeds. 3. Change the VFD 4. If the fault persists, replace the module.
123	Purge rate proving failed	L	
128	Fan speed failed during prepurge	H or L	
129	Fan speed failed during preignition	H or L	
130	Fan speed failed during ignition	H or L	
131	Fan movement detected during standby	H	
132	Fan speed failed during run	H	
137	ILK (Interlock) failed to close	H	1. Check wiring and correct any possible shorts. 2. Check Interlock (ILK) switches to assure proper function. 3. Verify voltage through the interlock string to the interlock input with a voltmeter. 4. If steps 1-3 are correct and the fault persists, replace the module.
149	Flame detected	H or L	Create a Hold if a flame is detected during Safe Start check up to Flame Establishing period.
150	Flame not detected	H	Sequence returns to standby and restarts sequence at the beginning of Purge after the HF switch opens if flame detected during Safe Start check up to Flame Establishing period.
154	Purge Fan switch On	H or L	1. Purge fan switch is off when it should be on. 2. Check wiring and correct any errors. 3. Inspect the Purge Fan switch J6 terminal 3 and its connections. Make sure the switch is working correctly and is not jumpered or welded. 4. Reset and sequence the relay module. 5. If the fault persists, replace the relay module.
155	Purge fan switch Off	H or L	

156	Combustion pressure and flame On	H or L	1. Check that flame is not present in the combustion chamber. Correct any errors. 2. Make sure that the flame detector is wired to the correct terminal. 3. Make sure the F & G wires are protected from stray noise pickup. 4. Reset and sequence the module, if code reappears, replace the flame detector. 5. Reset and sequence the module, if code reappears, replace the module.
157	Combustion pressure and flame Off	L	
158	Main valve On	L	1. Check the main valve terminal wiring and correct any errors. 2. Reset and sequence the module. If fault persists, replace the module.
159	Main valve Off	L	1. Check the main valve terminal wiring and correct any errors. 2. Reset and sequence the module. If fault persists, replace the module.
160	Ignition On	L	1. Check Ignition terminal wiring and correct any errors. 2. Reset and sequence the module. If fault persists, replace the module.
161	Ignition Off	L	1. Check the ignition terminal wiring and correct any errors. 2. Reset and sequence the module. If fault persists, replace the module.
164	Block intake On	L	1. Check wiring and correct any errors. 2. Inspect the Block Intake Switch to make sure it is working correctly. 3. Reset and sequence the module. 4. During Standby and Purge, measure the voltage across the switch. Supply voltage should be present. If not, the Block Intake Switch is defective and needs replacing. 5. If the fault persists, replace the relay module.
165	Block intake Off	L	
172	Main relay feedback incorrect	L	Internal fault. 1. Reset module. 2. If fault repeats, replace module.
174	Safety relay feedback incorrect	L	
175	Safety relay open	L	
176	Main relay On at safe start check	L	
178	Safety relay On at safe start check	L	

184	Invalid Blower/ HSI output setting	L	1. Recheck selected parameters, reverify and reset module. 2. If fault repeats, verify electrical grounding. 3. If fault repeats, replace module.
185	Invalid Delta T limit enable setting	L	
186	Invalid Delta T limit response setting	L	
187	Invalid DHW (Domestic Hot Water) high limit enable setting	L	
188	Invalid DHW (Domestic Hot Water) high limit response setting	L	
189	Invalid flame sensor type setting	L	
192	Invalid igniter on during setting	L	
193	Invalid ignite failure delay setting	L	
194	Invalid ignite failure response setting	L	
195	Invalid ignite failure retries setting	L	
196	Invalid ignition source setting	L	
197	Invalid interlock open response setting	L	
198	Invalid interlock start check setting	L	
199	Invalid LCI (Limit Control Input) enable setting	L	
200	Invalid lightoff rate setting	L	
201	Invalid lightoff rate proving setting	L	
202	Invalid MFEP (Main Flame Establishing Period) time setting	L	
203	Invalid MFEP (Main Flame Establishing Period) flame failure response setting	L	
204	Invalid NTC sensor type setting	L	

205	Invalid Outlet high limit response setting	L	1. Recheck selected parameters, reverify and reset module. 2. If fault repeats, verify electrical grounding. 3. If fault repeats, replace module.
207	Invalid PII (Pre-Ignition Interlock) enable setting	L	
210	Invalid Postpurge time setting	L	
211	Invalid Power up with lockout setting	L	
212	Invalid Preignition time setting	L	
213	Invalid Prepurge rate setting	L	
214	Invalid Prepurge time setting	L	
215	Invalid Purge rate proving setting	L	
216	Invalid Run flame failure response setting	L	
217	Invalid Run stabilization time setting	L	
218	Invalid Stack limit enable setting	L	
219	Invalid Stack limit response setting	L	
220	Unconfigured Delta T limit setpoint setting	L	
221	Unconfigured DHW (Domestic Hot Water) high limit setpoint setting	L	
222	Unconfigured Outlet high limit setpoint setting	L	
223	Unconfigured Stack limit setpoint setting	L	
224	Invalid DHW (Domestic Hot Water) demand source setting	L	
225	Invalid Flame threshold setting	L	
226	Invalid Outlet high limit setpoint setting	L	
227	Invalid DHW (Domestic Hot Water) high limit setpoint setting	L	
228	Invalid Stack limit setpoint setting	L	
229	Invalid Modulation output setting	L	
230	Invalid CH (Central Heat) demand source setting	L	
231	Invalid Delta T limit delay setting	L	
232	Invalid Pressure sensor type setting	L	
234	Invalid Outlet high limit enable setting	L	
235	Invalid Outlet connector type setting	L	
236	Invalid Inlet connector type setting	L	
237	Invalid DHW (Domestic Hot Water) connector type setting	L	
238	Invalid Stack connector type setting	L	
239	Invalid Header connector type setting	L	
240	Invalid Outdoor connector type setting	L	

Notes:

All Manuals (Install & Operate, Start Up, and Service Manuals) can be downloaded at

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LAARS® Heating Systems Company
A subsidiary of BRADFORD WHITE® Corporation

Customer Service and Product Support: **800.900.9276 • Fax 800.559.1583**
Headquarters: **20 Industrial Way, Rochester, NH, USA 03867 • 603.335.6300 • Fax 603.335.3355**
9 Brigden Gate, Halton Hills, Ontario, Canada L7G 0A3 • 905.203.0600 • Fax 905.636.0666
www.Laars.com

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