

Technical Supplement

Reporter



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The Aqua-Hot Reporter

The Aqua-Hot Reporter is a new generation of command and control module that manages all functions of the Aqua-Hot from start-up to shutdown. The Reporter is used across the 400, 450, 600, and 675 units. The previously used electronic control board has been retired on new units in favor of the Reporter.

There are two series of Reporters presently in use: Reporter 1.0 and Reporter 2.0. Reporter 1.0 was launched November 30, 2018, and Reporter 2.0 was launched September 9, 2019.

The launch of Reporter 2.0 allowed an opportunity to improve upon the 1.0 design where ever it was deemed necessary. The Reporter 2.0 features the following design improvements:

- Over-Temperature Fault Functionality
- Precise fluid coolant temperature display
- Boost pumps are now powered directly by the Reporter
- 600D/675D Owners may now select a pump for fluid stir

Functionality:

The Reporter was designed with a touch-screen interface to simplify and standardize unit use and troubleshooting. Screen navigation and access is now standardized across the Aqua-Hot 400 Series Propane/Diesel (PO2/D02 and newer), 450 Series Diesel (DE5 and newer), and 600 Series (D04 and newer).

The Reporter also contains fault logging functionality, troubleshooting tools, and testing functions. Each of these functions will be explained in detail.

Basic Features:

The Home Screen is the first screen shown on the Reporter. Reporter 1.0 and Reporter 2.0 home screens do differ.

The most substantial difference between the Reporter 1.0 and 2.0 is the inclusion of a thermistor in place of the standard control thermostat. This allows specific Aqua-Hot coolant tank temperatures to be displayed on the Reporter, and relayed to the on-board comfort control systems (if the coach manufacturer installs one). The tank temperature sensor allows more granular control of the Aqua-Hot by switching away from the static temperature limitations imposed by the previous control thermostat.

The Reporter contains a host of diagnostic and troubleshooting tools to more easily repair and operate Aqua-Hot units. These features are organized into pages and sections that are further explained in this guide.

Home Screen

The home screen contains information about the Aqua-Hot system status, as well as model and serial number information.

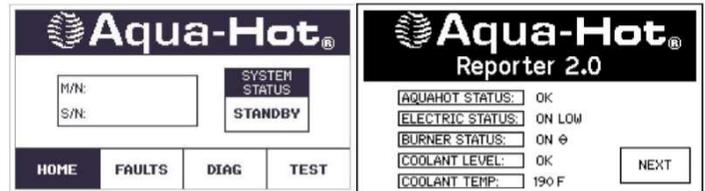


Figure 1

Fault Status

The fault status page contains the last seven faults which were observed by the Reporter, regardless of how much time has passed.

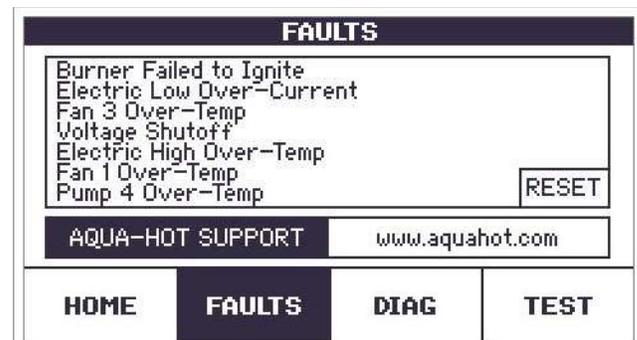


Figure 2

Coach Side I/O

This page of the Reporter will indicate the current status of elements and switches within the coach; such as, the coach is requesting hot water or heat.

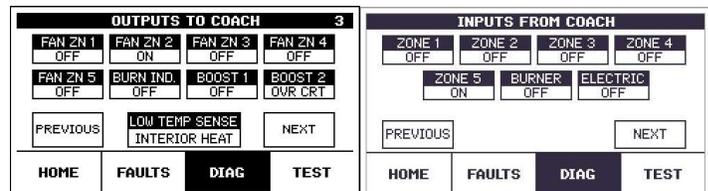


Figure 3

Aqua-Hot I/O

The Aqua-Hot I/O page will show the current status of elements, sensors, and components within the Aqua-Hot itself.

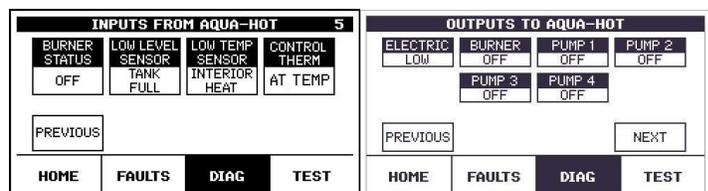


Figure 4

Heat Testing:

The heat testing page of the Reporter will allow the electric and burner heating sub-systems to be independently activated for troubleshooting and testing purposes.

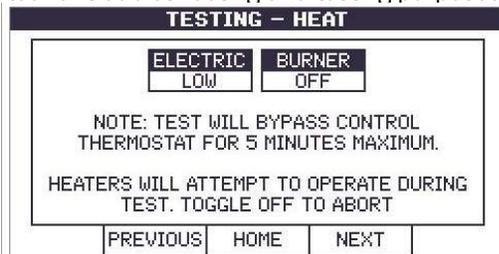


Figure 5

Fan Testing:

The fan testing section of the Reporter will allow the heat exchanger fans within the coach to be activated independently of the rest of the Aqua-Hot.

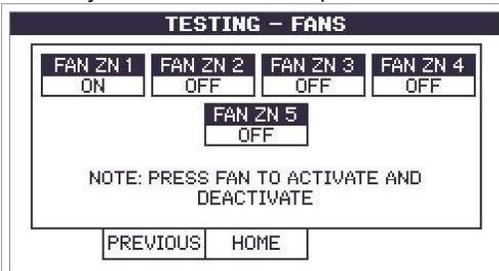


Figure 6

Pump Testing:

The pump testing page of the Reporter functions similarly to the fan testing page in that, from this Reporter page, pumps within the Aqua-Hot can be activated independently from other elements for their functionality to be verified.

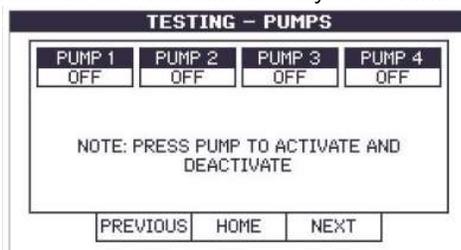


Figure 7

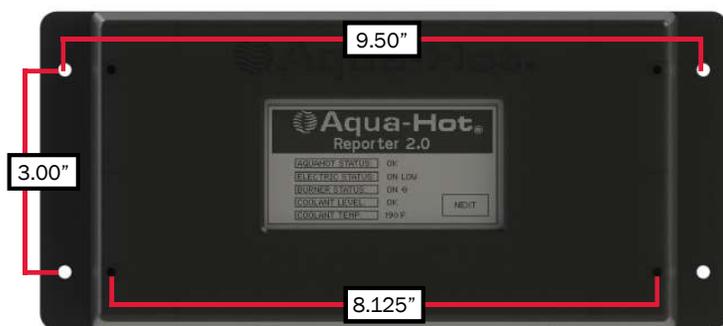


Figure 8

Heartbeat Function

Aqua-Hot Reporter units with at least firmware version 1v5 and all Reporter 2.0 units are equipped with a “heartbeat” function which establishes a signal between the RV-C system and the Reporter.

The Reporter 12V+/- wires are connected directly to the coach battery. The Reporter has an RV-C incorporated house power sense in the event RV-C connection is lost, i.e. house batteries disconnected or RV-C network has failed.

The Reporter will be constantly awaiting a signal from the RV-C network indicating to the Reporter that it is to continue normal operation. Loss of 6 consecutive signals from the RV-C network will trigger the Reporter to deactivate the Aqua-Hot.

This serves as a safety feature to ensure that the Aqua-Hot does not continue to operate if the coach loses power. Once power is restored to the coach and the Reporter unit, “BATTERY DISCONNECT SWITCH OFF” will be displayed in the fault log, indicating that the Reporter has lost connectivity with the RV-C network, and subsequently deactivated.

Technical Information

Mounting:

The Aqua-Hot Reporter can be mounted in two different fashions, either surface mount or recessed mount. Dimensional specifications are shown below. When surface mounting, use a #10 or larger screw. If recessed mounting, use a #6 screw.

There is a slot located at the bottom of the Reporter which serves as access for the harness and power connections. Take these into consideration when choosing the mounting location for the Reporter. Circular dimensions are edge to center.

Aqua-Hot sheet metal cabinets have reference features indented into them for mounting the Reporter to the Aqua-Hot if desired.

NOTE: For networked control of the Reporter, Aqua-Hot requires system integrators ensure that individual commands are received and processed. Aqua-Hot requires that commands be repeated or confirmed so that if a single message were dropped, or if there is a brief network disturbance, the Reporter would get into the correct state as soon as the disruption was removed.

The Aqua-Hot Reporter monitors the heating system and handles all logic relating to safeties and heating control. As such, the system integrator is required to display all pertinent status information but not use that information to lock out operation or add additional safety layers that could impact the end of operation if a message from the Reporter was missed.

Boost Pumps

Boost pump functionality has changed with the implementation of the Reporter 2.0.

On Reporter 1.0 units, any boost pumps at use within the coach required a relay connected to wires 3b and 5b in order to operate.

With Reporter 2.0, that relay can now be eliminated, with boost pump power and functionality now being handled directly by the Reporter. Using a flag-terminal, connect the boost pump directly to the harness bearing in mind the requirements below.

- Zone 1: Connect to Wire 5b
 - Max Current Draw: 5.0A
 - Over-Current Condition: 8.0A
- Zone 2: Connect to Wire 3b
 - Max Current Draw: 3.0A
 - Over-Current Condition: 5.0A

Original Equipment Manufacturers (OEMs) will need to provide the ground for operating boost pumps from the Reporter.

Electrical Specifications:

The Reporter contains a single Amphenol ATP family connector that serves as the power connection to the coach side 12V DC power system. Mating connection components are not supplied by Aqua-Hot. Compatible part numbers and manufacturers are supplied below. The Reporter must be operated to the below listed specifications.

Minimum Voltage.....	11.0V DC
Maximum Voltage.....	15.0 V DC
Minimum Current.....	75mA
Maximum Current.....	15A

Please note that the minimum current rating is the minimum requirement for what will operate the Reporter. Operating at this current rating will not provide sufficient power to any components dependent upon the Reporter.

Input Load currents

Zone Thermostats (each).....	appx. 1mA
Diesel Burner Switch.....	appx. 1mA
Electric Element Switch.....	appx. 1mA
Low-Level Cutoff Switch.....	appx. 1mA
Control Thermostat (Reporter 1.0).....	appx. 1mA
Tank Temperature Sensor (Reporter 2.0).....	appx. 1mA
Low-Temperature Cutoff Thermostat.....	appx. 1mA

Output Load currents

Zone Fans (Reporter 1.0/all).....	3.0A max
Zone Fan 1 (Reporter 2.0).....	8.0A max
Zone Fans 2-5 (Reporter 2.0).....	5.0A max
Zone Fans (all).....	0.25A max
Circulation Pumps (each).....	2.0A max
AC Relay.....	0.5A max
Burner Power.....	6.0A max

Burner Master Control.....	2.0A max
Burner Thermostat Control.....	1.0A max

Connection Terminal Information

RV-C Mating Connection		
Mfg.	Part Number	Description
3M	37104-A165-00E-MB	RV-C Connection Housing

Reporter Power Connection		
	Deutsche	Amphenol
Pins	1060-12-0222	AT60-12-0222
Housing	DTP04-2P	ATP04-2P
Wedge	WP-2P	AWP-2P

Harness Connections			
Mfg.	Part Number	Description	Mate
TE	1-480706-0	09P UMNL Plug	J1
TE	1-480710-0	15P UMNL Plug	J2
3M	37104-2165-000 FL 100	CONN Plug 2MM 4POS 20-22 AWG	J3
TE	1-480708-0	12P UMNL Plug	J7
TE	1-480704-0	06P UMNL Plug	J8
TE	640582-1	08P UMNL Plug	J9

Sockets			
Mfg.	Part Number	Description	Mate
TE	350550-1	UMNL SOK 20-14 TIN/PHBZ L/P	J1 J2 J3 J7 J8 J0

Socket Crimping Tool		
Mfg.	Part Number	Description
TE	90547-1	ASSY Pro-Crimper M-N-L

Filling and Purging the Aqua-Hot

Introduction:

Filling the Aqua-Hot will be one of the last steps to be completed after installing an Aqua-Hot. The fill procedure differs from older Aqua-Hot units due to the introduction of the Reporter.

Instructions:

1. Locate the fluid drain port of the Aqua-Hot. This is located at the front of the unit near the bottom of the tank face.
2. Connect an external fluid fill pump to the fluid drain valve. A ½” NPT barbed fitting is best suited for this task.
3. Place the supply line of the pump in a source of GRAS propylene glycol antifreeze.
4. Locate the Reporter, and navigate to the “INPUTS FROM AQUA-HOT” page.
5. Pay attention of the “LOW LEVEL SENSOR” item on this page.

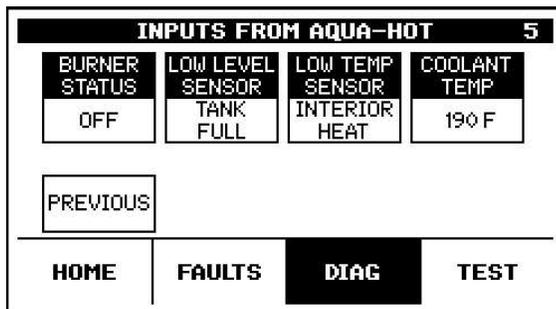


Figure 9

6. Fill the tank to approximately ¾ full, or until the “LOW LEVEL SENSOR” item displays “TANK FULL”.
7. Once the tank is partially full, deactivate the external fluid fill pump and close the drain valve. DO NOT disconnect the fluid pump.
8. Navigate to the “PUMPS” page of the “TESTING” section.

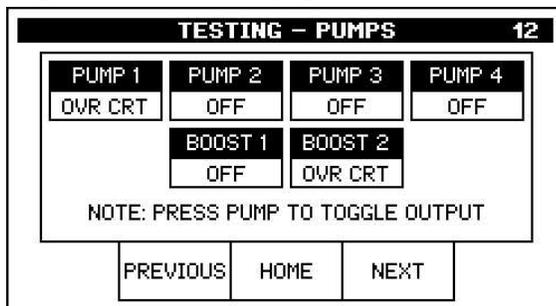


Figure 10

9. Tap each of the pumps to independently activate them, beginning the heating loop purge procedure. These pumps will remain active for a maximum of 5 minutes. They will need to be reactivated as needed until the purge procedure is complete.
10. Continue to fill the unit as air is purged from the interior heating loop.
11. Once the air is no longer returned from the heating zone return ports, deactivate the fluid circulation pumps.
12. Open the fluid drain valve, and activate the external fluid fill pump. Fill the unit with GRAS propylene glycol antifreeze and water heating solution until it reaches the “COLD” mark on the fluid expansion bottle.

NOTE: Do not fill this unit completely. Filling the unit completely runs the risk of air-locking, preventing the heating zone from correctly circulating and draining the air.

Fault Conditions

Introduction:

The Reporter contains five distinct categories of fault conditions which will assist in diagnosing and repairing the Aqua-Hot should problems arise. Low-voltage, over-temperature, and over-voltage fault conditions will be accompanied by the component which triggered the fault. It is best practice to record all conditions at the “FAULT” screen. Fault conditions are also recorded in the fault log on the “TEST” tab. When using the fault log, it is important to know that this log cannot be cleared, and may contain information on faults not pertaining to a present issue.

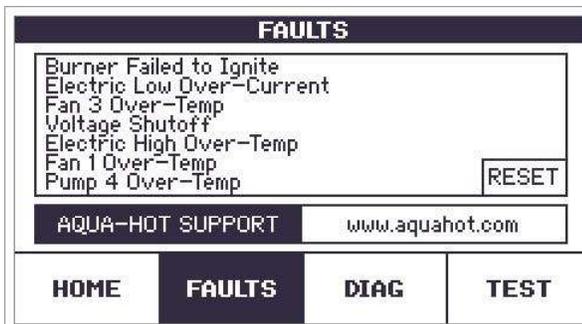


Figure 11

Reset Feature

The RESET button shown above on the Reporter fault screen can be used to reset the Reporter after a component has been changed or modified. Some components will require a full power-cycle in order to fully reset the Aqua-Hot system.

Over-Current

An over-current fault condition occurs when too much current is drawn by a component (output channel), usually a fan or pump. When an over-current condition occurs, the Reporter will deactivate the output channel as a safety measure to prevent damage. This fault can only be cleared once the Reporter has been reset. Please note, that if the responsible component is not repaired or replaced, it can continually cause over-current fault conditions, thereby impacting the functionality of the Aqua-Hot unit.

Over-Temperature (Reporter 2.0)

The Over-Temperature fault condition occurs when the tank temperature sensor indicates that the unit has overheated. An overheat is realized when the antifreeze and water heating solution within the Aqua-Hot exceeds 210°F.

Low-Voltage

The Reporter is designed to operate between 11V Direct Current (DC) and 16V DC. If the Reporter detects that it is receiving less than 11.8V DC, it will display a low-voltage fault. If the Reporter

drops below 11.2V DC for more than 30 seconds, a safety mechanism will activate, shutting down the Aqua-Hot.

Low-Level Cut Off

Aqua-Hot units require a minimum amount of antifreeze in order to function correctly. Keep in mind that the exact fluid volume may differ depending on the layout of your coach. If the heater drops below the minimum fill level as indicated on the expansion bottle, the Reporter will shut down all fans, pumps, and heat sources until the unit has been refilled and the Reporter has been reset.

Ignition Failure

Ignition failure fault conditions will occur if the burner inside the heater fails to ignite. This is all the fault condition will display. Precise diagnosis herein will require in-depth troubleshooting.

Testing

Introduction:

The Reporter retains the functionality to independently activate certain components and sub-systems within the Aqua-Hot heater. The systems that can be independently activated are the burner, electric element, and burner indicator light. For testing procedures, only one system can be activated as independent components. These components and sub-systems will remain active for only five minutes, and are NOT a substitute for normal operation. Aqua-Hot Heating Systems is not liable for damages resulting from attempting to use testing functions in place of standard operation.

Pumps

Pumps on your heater can be independently activated using the Reporter. These can be used to verify functionality, or to purge fluid lines of air. Select each pump from the screen to activate. Keep in mind that these testing screens will ignore input from the fluid level sensor. On Reporter units with firmware version 1v7 and earlier, pump 2 will serve as the stir pump on 600 Series and Pump 3 serves as the stir pump on 400 Series.

600D and 675D units with firmware version 1v8 and later, and all Reporter 2.0 units allow for stir pump selection between zone 2 and zone 3 pumps. This setting can be accessed by pressing and holding the serial number panel on the Home screen.

Fans

Using the “FANS” screen, it is possible to activate fans in each zone to test for functionality. This is similar to the pumps screen, allowing you to activate one or multiple fans at the same time by selecting the desired fan.

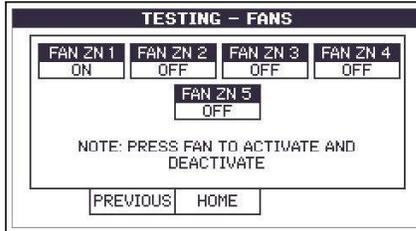


Figure 12

Heating

The heating tab will allow the burner, the burner indicator light, and the electric element to be activated and run for five minutes to test for functionality. During this time, inputs from the control thermostat are ignored to allow the test to take place. Do NOT activate the burner heat test without allowing the unit to cool. Not doing so could complicate further diagnosis and may cause irreparable damage to the Aqua-Hot.

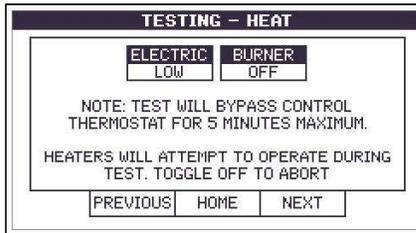


Figure 13

Diagnostic

The “DIAG” tab of the Reporter allows the user or technician to access input and output information to record communication information within the Aqua-Hot heater, and between the heater and the coach. This tab is read-only and will not allow the manipulation of the elements listed. There are four screens maintained under this tab: Inputs from Coach, Outputs to Coach, Inputs from Aqua-Hot, and Outputs to Aqua-Hot.

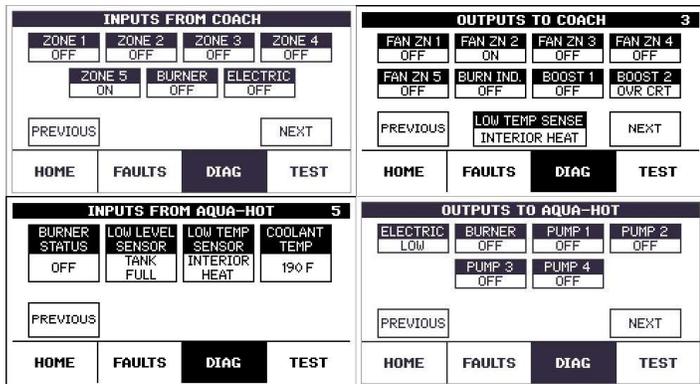


Figure 14

Pin-Out Information

Introduction:

The following section will detail the precise pin-out information for all of the terminals to be connected to the Reporter.

Wire Insertion View Shown

J8

The J8 plug is responsible for connections that pertain to sensor monitoring within the coach, and is standardized across all Reporter-bearing Aqua-Hot heating systems.

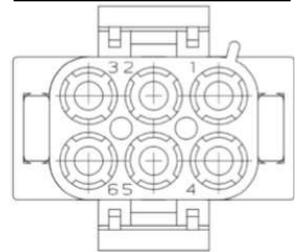


Figure 15

J8 Pin No.	Description	Wire No.
1	Low-Level Sensor Input	16
2	Low-Temp Sensor Input	10
3	Control Thermostat/Tank Temp Sensor (Reporter 2.0)	14
4	Low-Level Power Supply (12V DC+)	15
5	Low-Temp Power Supply (12V DC+)	9
6	Control Thermostat/Tank Temp Sensor (Reporter 2.0)	13

J1

The J1 plug manages heating zone inputs from the coach.

Wire Insertion View Shown

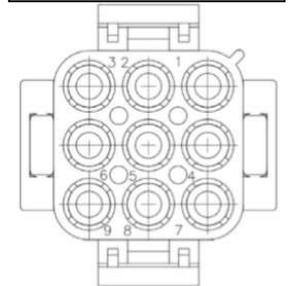


Figure 16

J1 Pin No.	Description	Wire No.
1	Diesel Input	51
2	Electric Low Input	53
3	Electric High Input (600/675 only)	40
4	Engine Preheat Input (N/A on 400 P/D)	55
5	Zone 1 Input (400/450)	95
6	Zone 2 Input (400/450)	91
7	Zone 3 Input (600/675)	87
8	Zone 4 Input (600/675)	83
9	Zone 5 Input (600/675)	79

J7

The J7 plug manages zone fans and the burner switch indicator light.

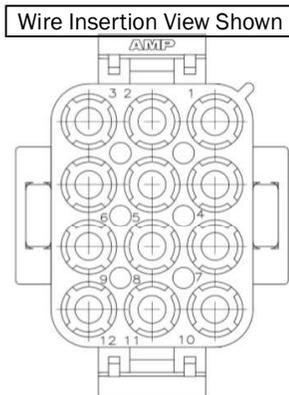


Figure 17

J7 Pin No.	Description	Wire No.
1	Zone Fan 4 (Switched 12V+)	80
2	Zone Fan 2 (Switched 12V+)	88
3	Burner Indicator Light	56
4	Zone Fan 4 Ground	81
5	Zone Fan 2 Ground	77
6	Burner Indicator Light Ground	57
7	Zone Fan 5 Ground	78
8	Zone Fan 3 Ground	85
9	Zone Fan 1 Ground	93
10	Zone Fan 5 (Switched 12V+)	76
11	Zone Fan 3 (Switched 12V+)	84
12	Zone Fan 1 (Switched 12V+)	92

J3

J3 serves as the RV-C connection to the coach-side comfort system (if applicable). The RV-C indicator light located on the back of the Reporter serves as a valuable diagnostic tool when the need to determine RV-C functionality arises.

Wire Insertion View Shown

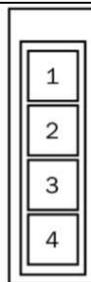


Figure 19

J3 Pin No.	Description
1	12V DC+ Current Out (Optional)
2	CAN-HIGH
3	CAN-LOW
4	Ground

J9

The J9 plug is an optional use terminal that provides constant 12V DC current to any attachments which may be added to the coach.

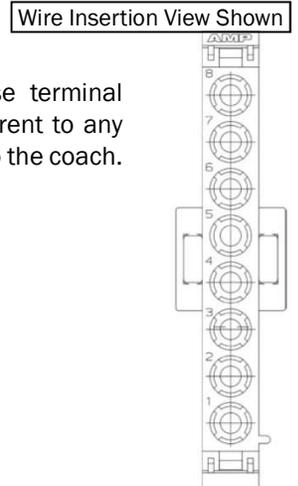


Figure 20

J9 Pin No.	Description	Wire No.
1	Engine Preheat	54
2	Electric	52
3	Diesel 12V DC Switch	50
4	Zone 5 Thermostat	78
5	Zone 4 Thermostat	82
6	Zone 3 Thermostat	86
7	Zone 2 Thermostat	90
8	Zone 1 Thermostat	94

J2

The J2 plug is responsible for managing return signals from within the coach.

Wire Insertion View Shown

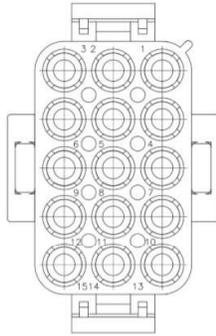


Figure 21

J2 Pin No.	Description	Wire No.
1	Pump 1 Output (12V DC+)	5A1
2	Pump 1 Ground	6
3	Zone 1 Boost Pump (400 Series)	-
4	Pump 2 Output (12V DC+)	3A1
5	Pump 2 Ground	4
6	Power On Signal	24
7	Pump 3 Output (12V DC+) N/A on 400P and 400D	1
8	Pump 3 Ground N/A on 400P and 400D	2
9	Electric High On-Signal(600 Series) Zone 2 Boost Pump (400 Series)	39
10	Pump 4 Output (12V DC+) 600/675 Only	7
11	Pump 4 Ground 600/675 Only	8
12	Electric Element On-Signal	11
13	AC Ground	12A
14	Burner Ground	21A
15	Diesel Burner Status Input	19

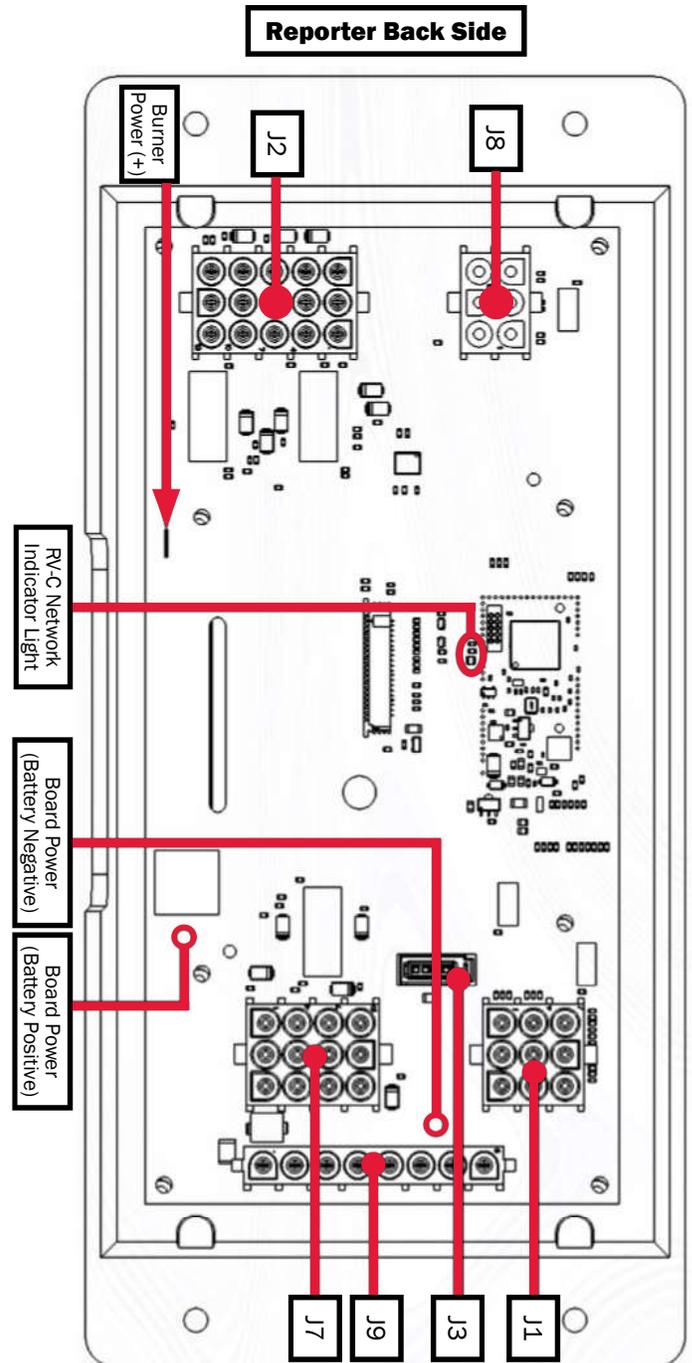


Figure 22

RV-C Network Connectivity

The Reporter was designed to interface with the coach-side RV-C network to aid in the Aqua-Hot's integration into the on-board RV-C network.

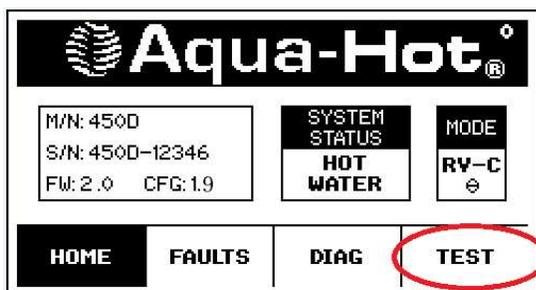
There is an indicator light on the back of the Reporter which shows the current status of the Reporter's connection to the RV-C network. This will be useful when diagnosing potential problems with the coach-side RV-C network.

LED Activity		Status
		Solid Green Reporter is connected to network and communicating properly
		OFF Reporter has no power, or has failed completely
		Solid Red Reporter has gone offline and is not connected to network
		Flashing Green (4/second) Reporter is attempting to make an initial connection to the network
		Flashing Green (1/second) The Reporter is online, but it has not received a valid network message for at least 5 seconds
		Alternating Red and Orange Reporter has gone offline and is attempting to re-connect (within 30 seconds)
		Alternating Green and Orange Reporter is currently online but has gone offline 2 or more times.

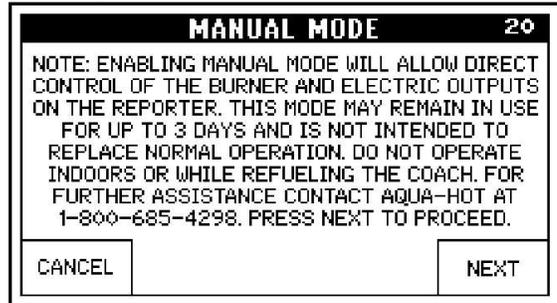
Manual Mode

The 2.0 Reporters with CFG 1.9 and greater come with a manual mode in case the general coach RV-C network fails. It will allow for limited operation while the larger network/module problem is addressed.

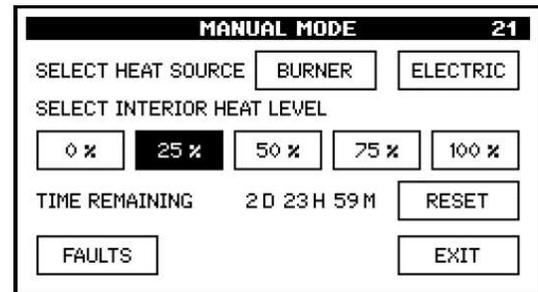
This mode can be accessed under the test page of the Aqua-Hot Reporter (see below).



Once the test page is open, select the MANUAL MODE and select "NEXT". Manual mode will continue to run for up to 3 days without any user intervention. Pressing the reset button at any time while enabled will reset the timer, and run for an additional 3 days.



All heating zones are linked together and can be run at 25%, 50%, 75%, and 100% (as shown below). The burner and electric can be enabled or disabled. For all levels, there is a 10 minute duty cycle period that will allow Cozy fans to be on for the specified percentage of 10 minutes. Example, 25% would be on for 2.5 minutes, and then off for 7.5 minutes. It always starts with the on-cycle, then shuts off for the remainder of the 10 minute period.



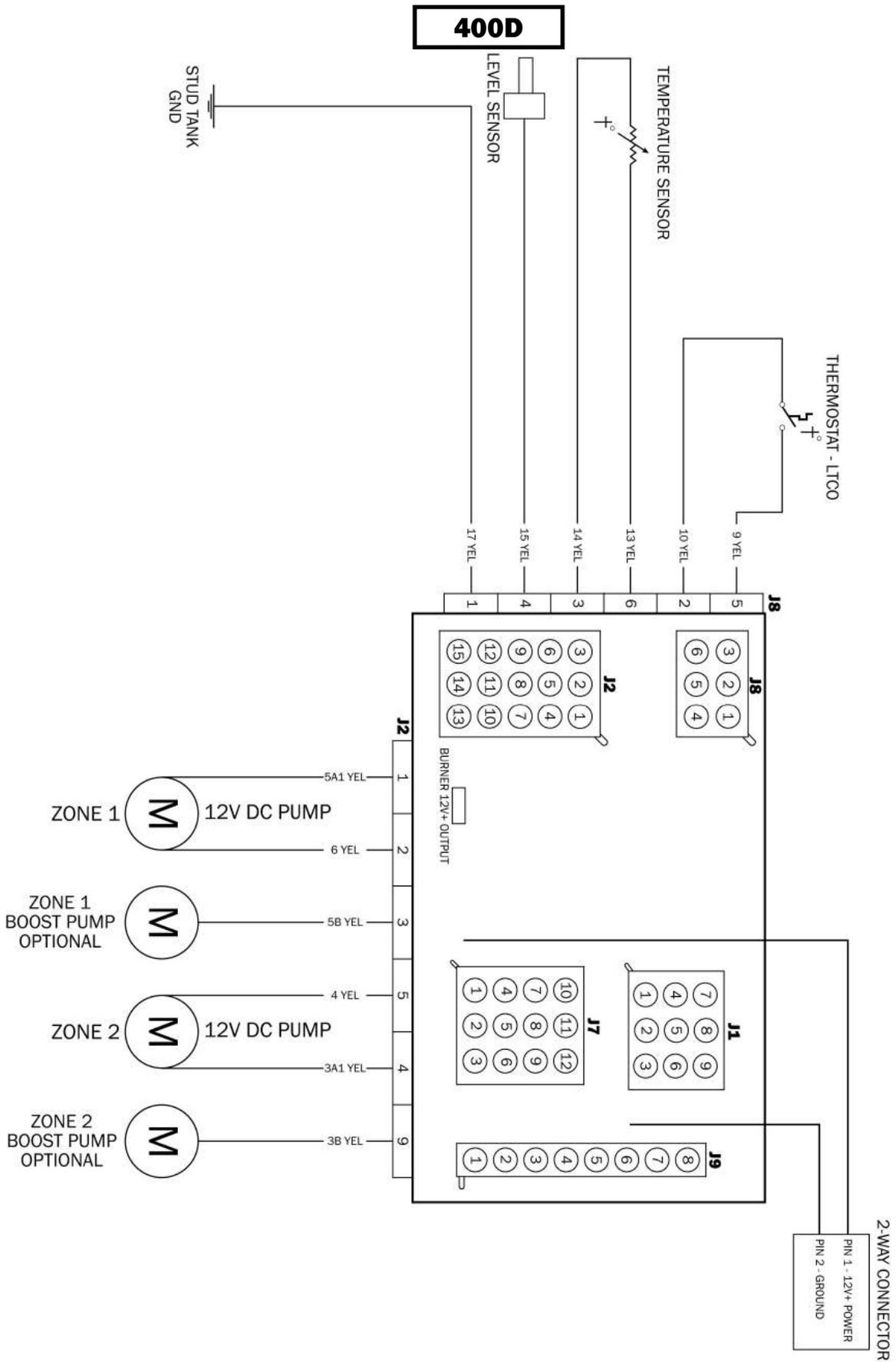
NOTE: On the 600/675 units, electric can be operated in low or high modes.

If the system power is cycled, the manual mode will be disabled and must be manually reactivated. Leaving the manual mode page will also disable manual mode and restore normal operation. Leaving manual mode should be done once the system failure has been resolved and normal operation can resume.

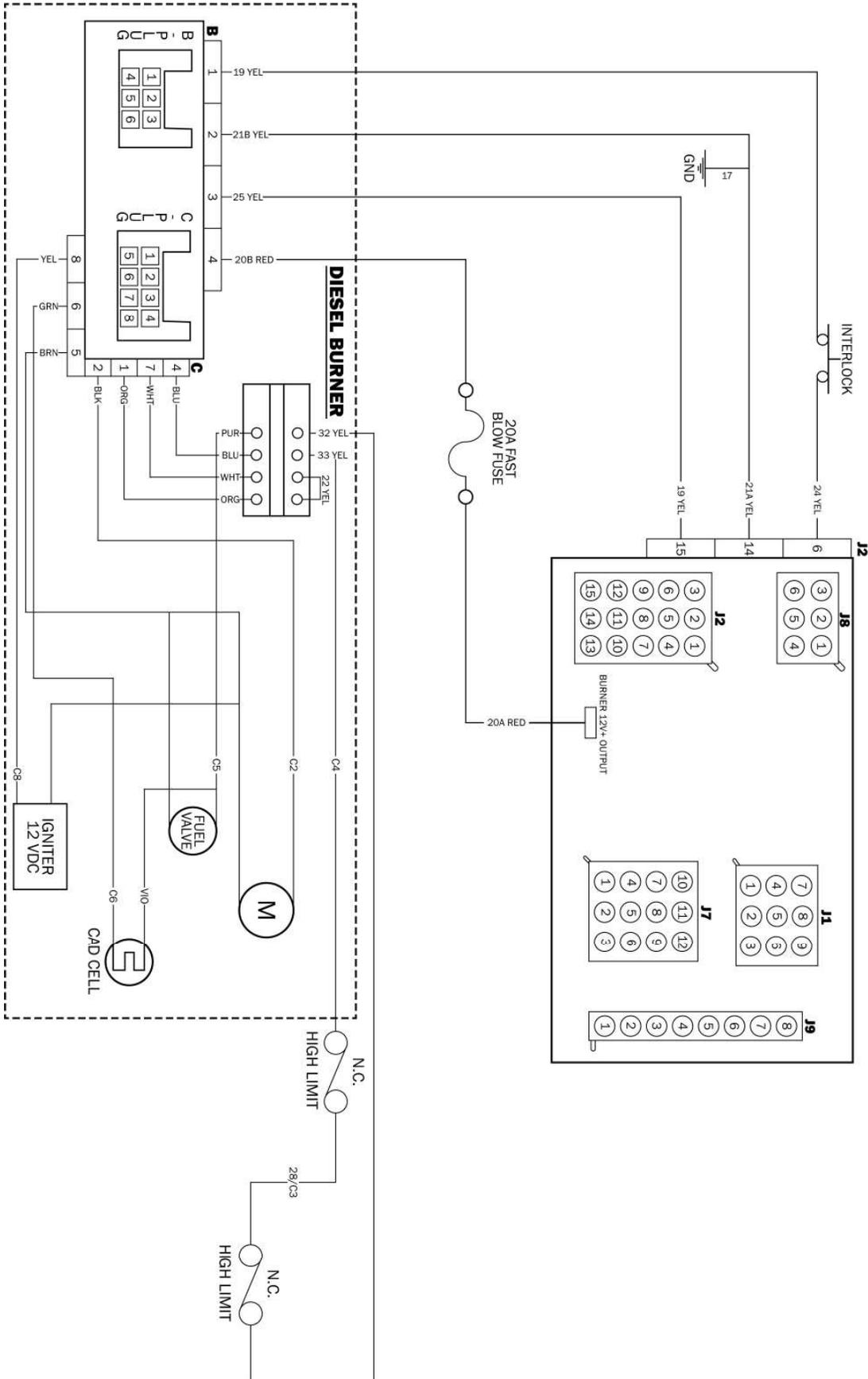
NOTE: If using the rocker switches, burner & electric switches must be toggled on/off after leaving Manual Mode.

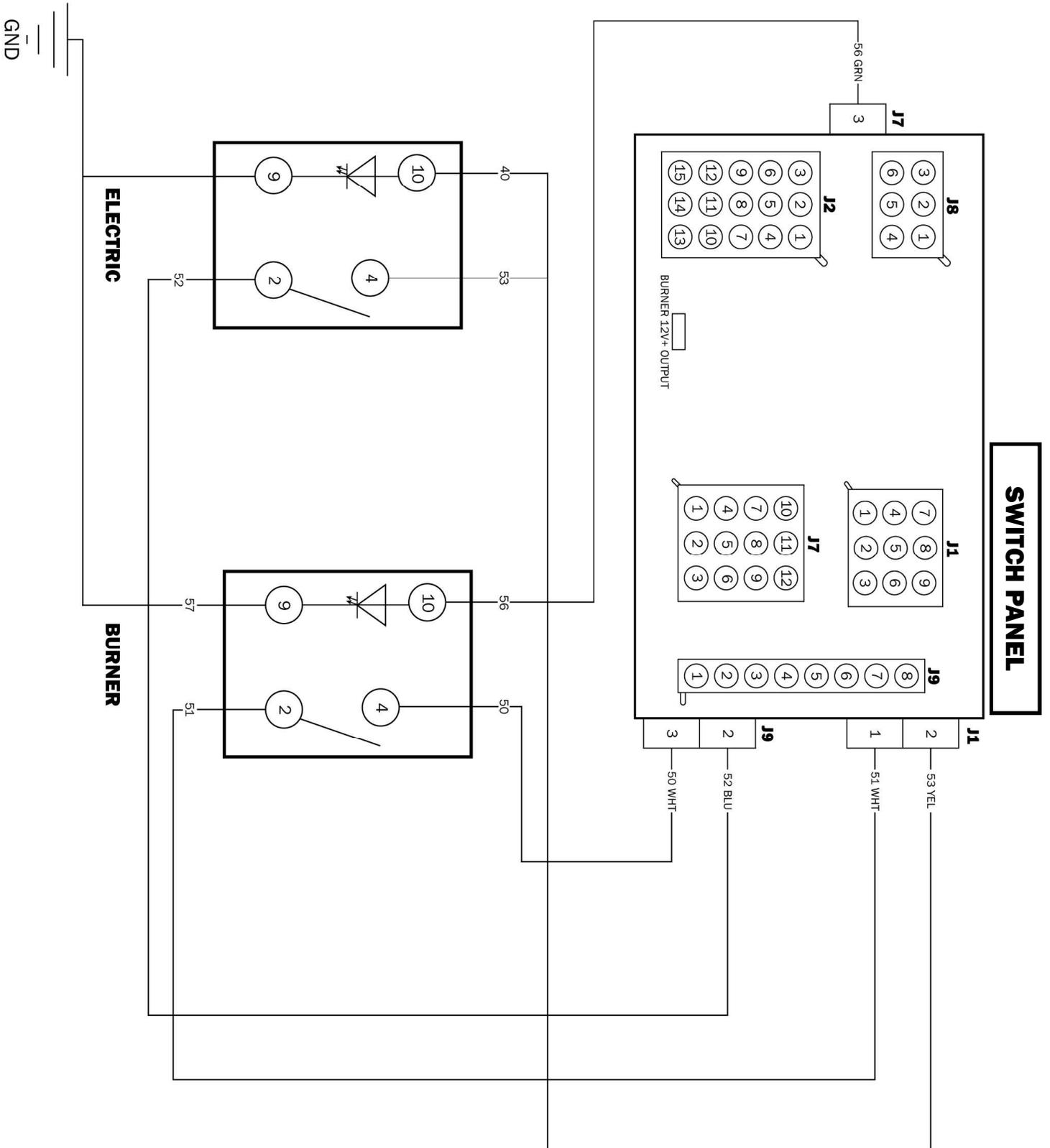
Please call the Technical Service Department if you encounter any difficulties while performing this procedure. 1 800-685-4298 from 7:00am-4:00pm MST Monday through Friday.

POWER INPUTS, PUMPS, AND SAFETIES

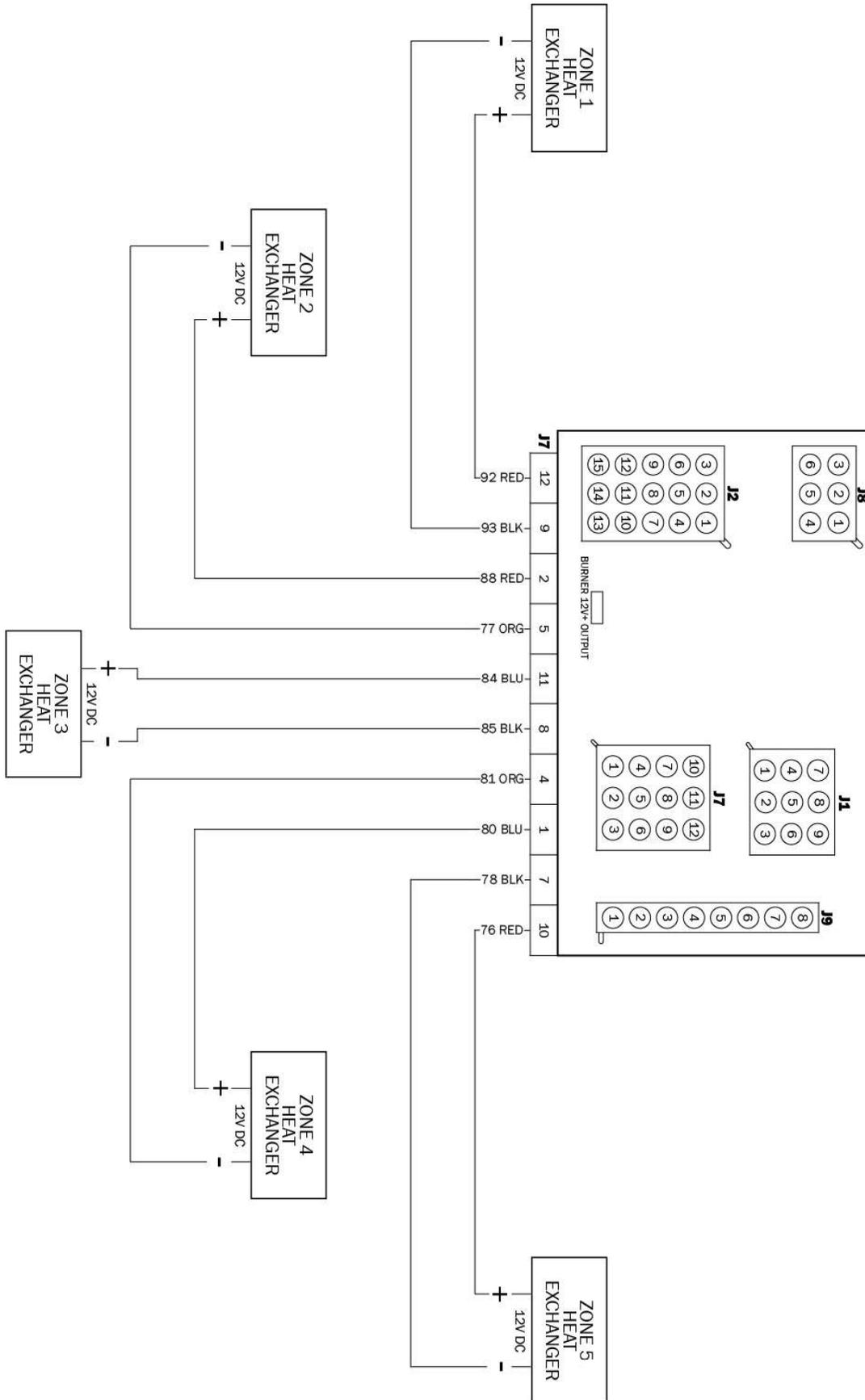


BURNER

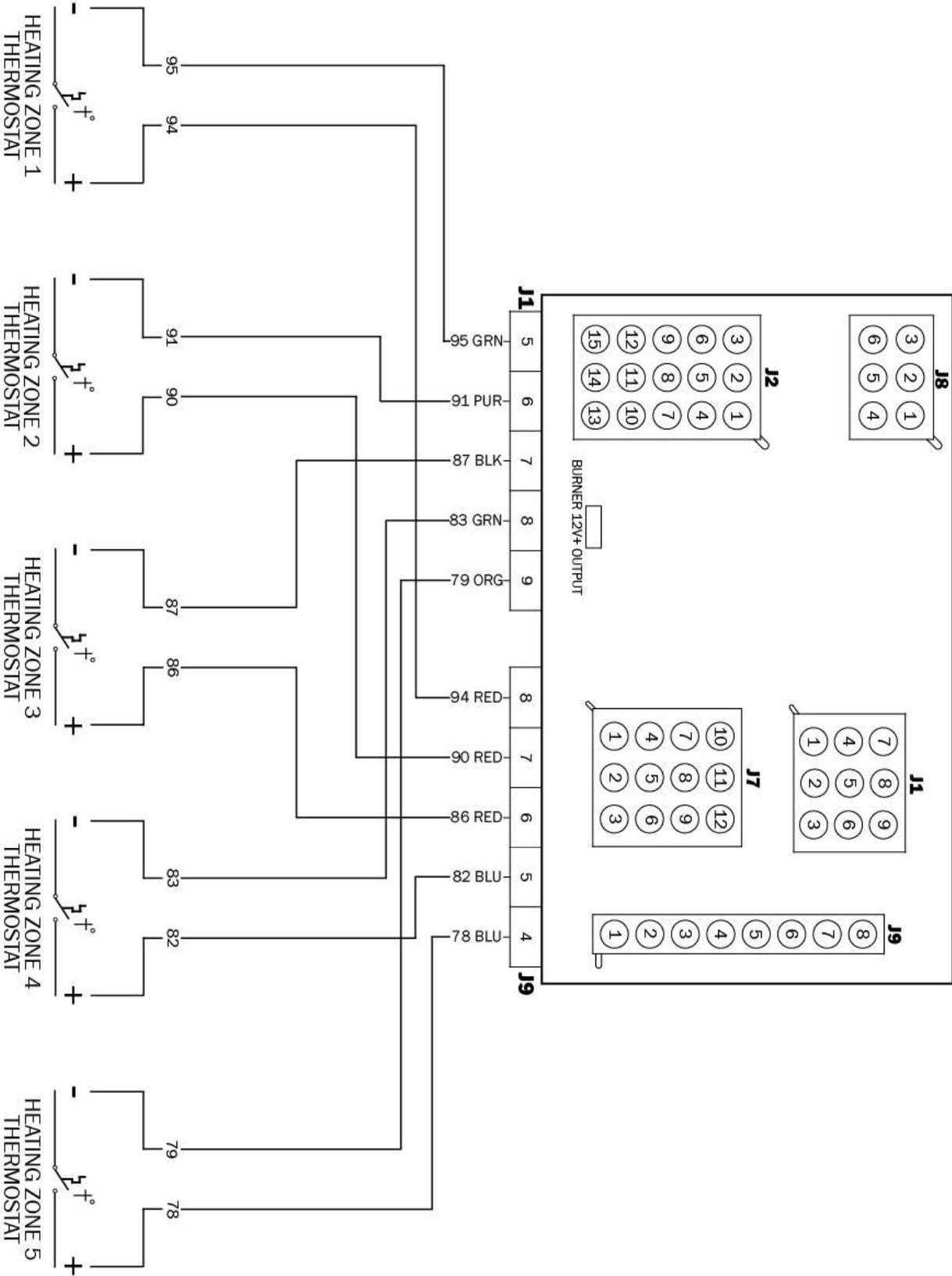




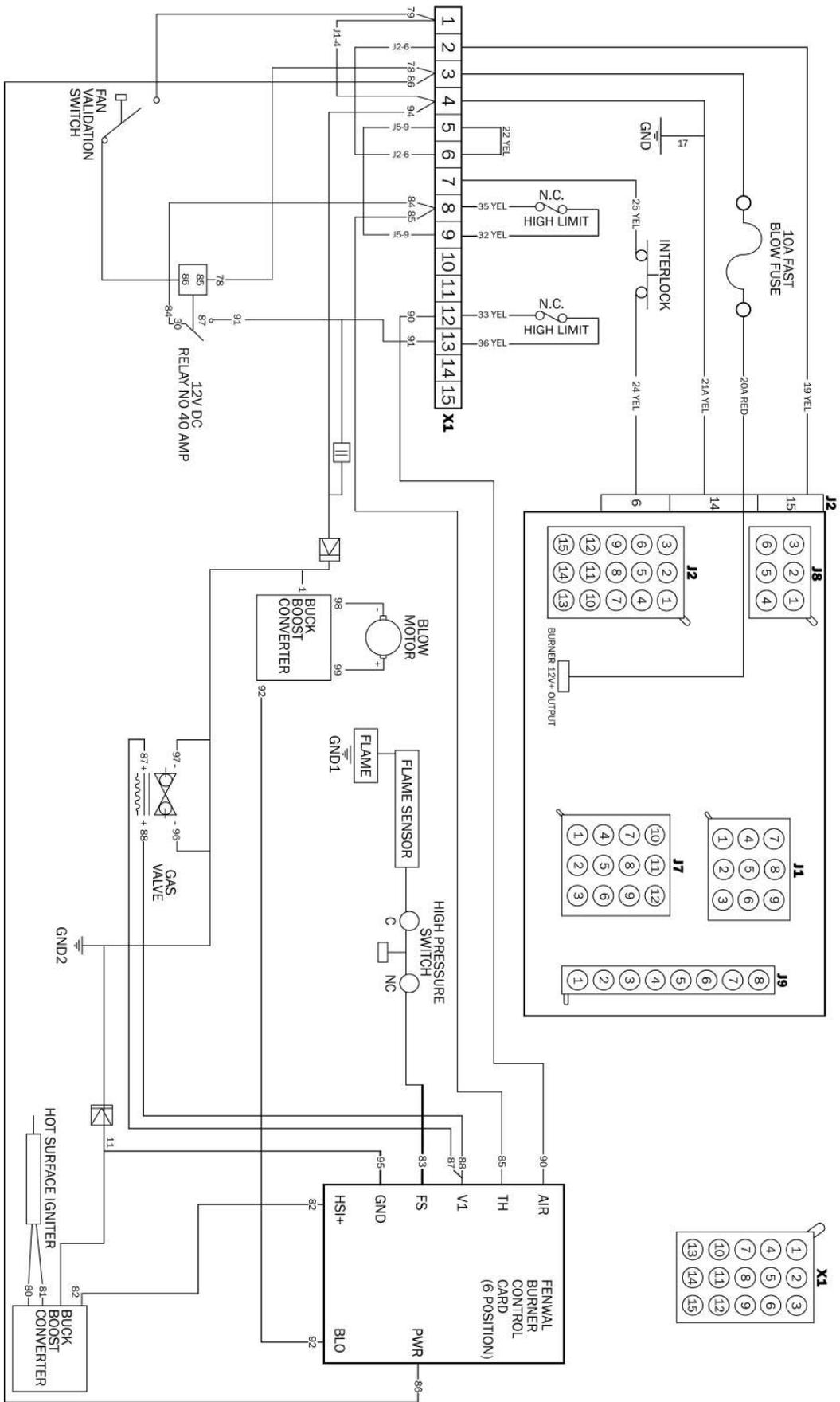
HEAT EXCHANGERS



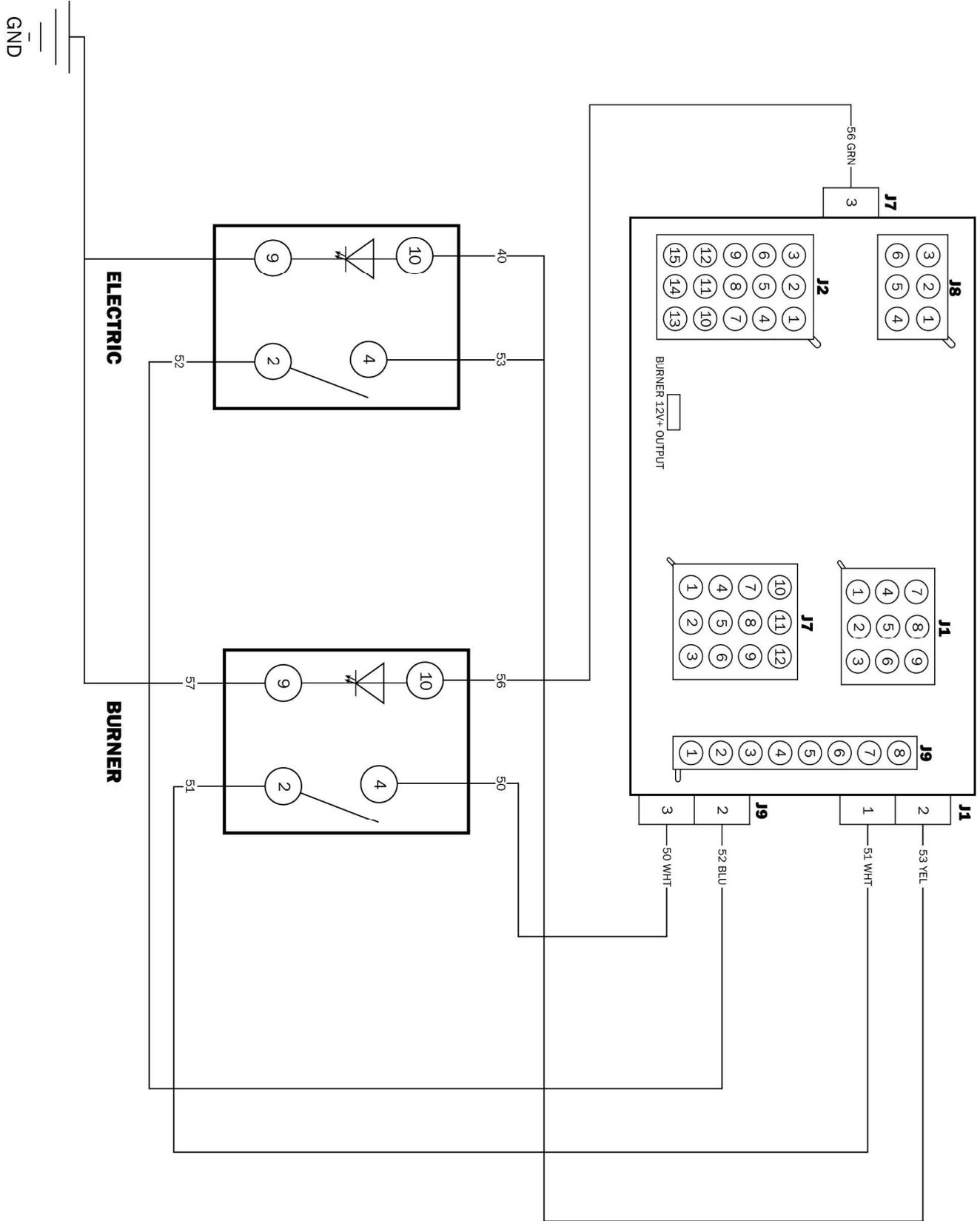
HEATING ZONES



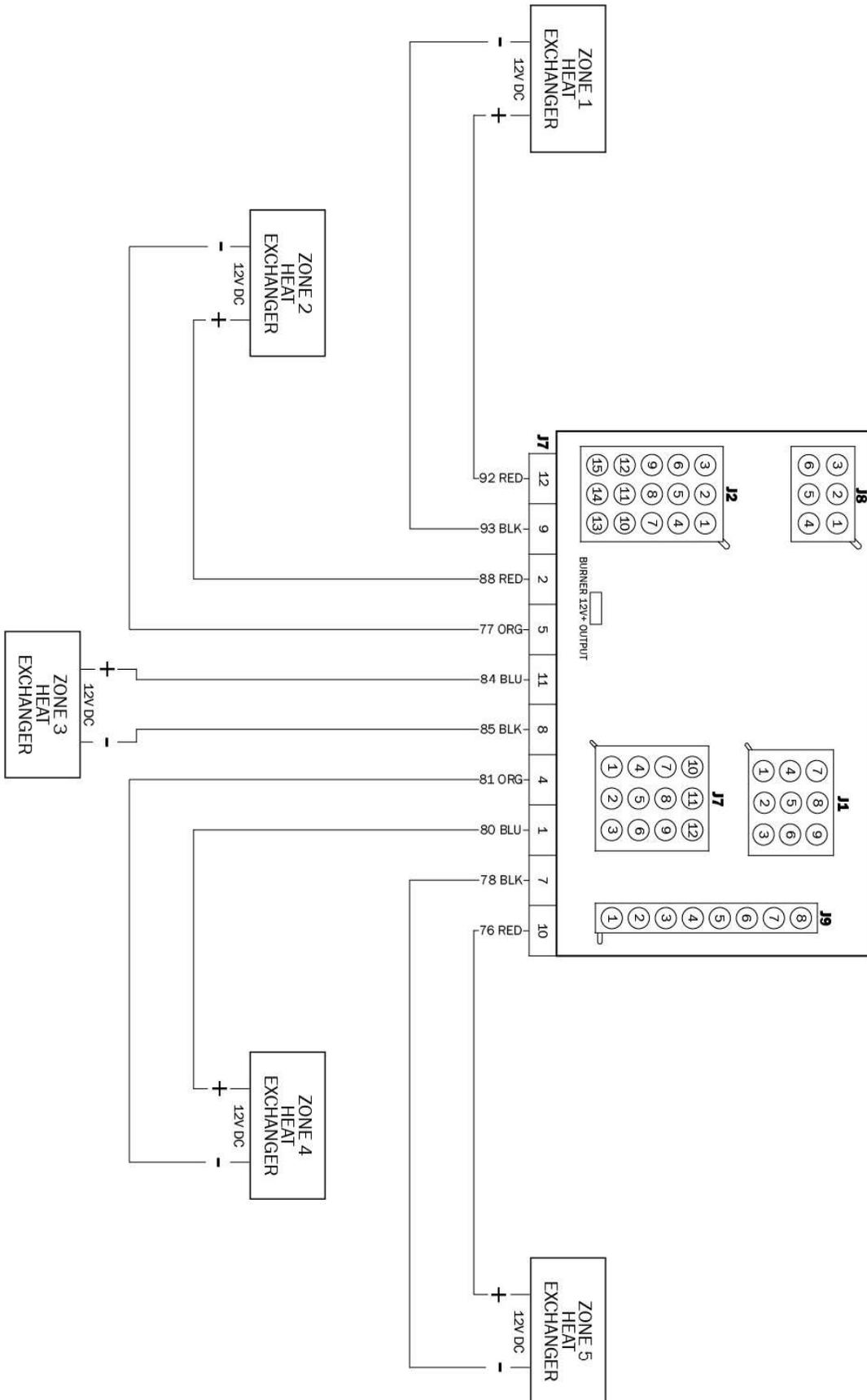
BURNER



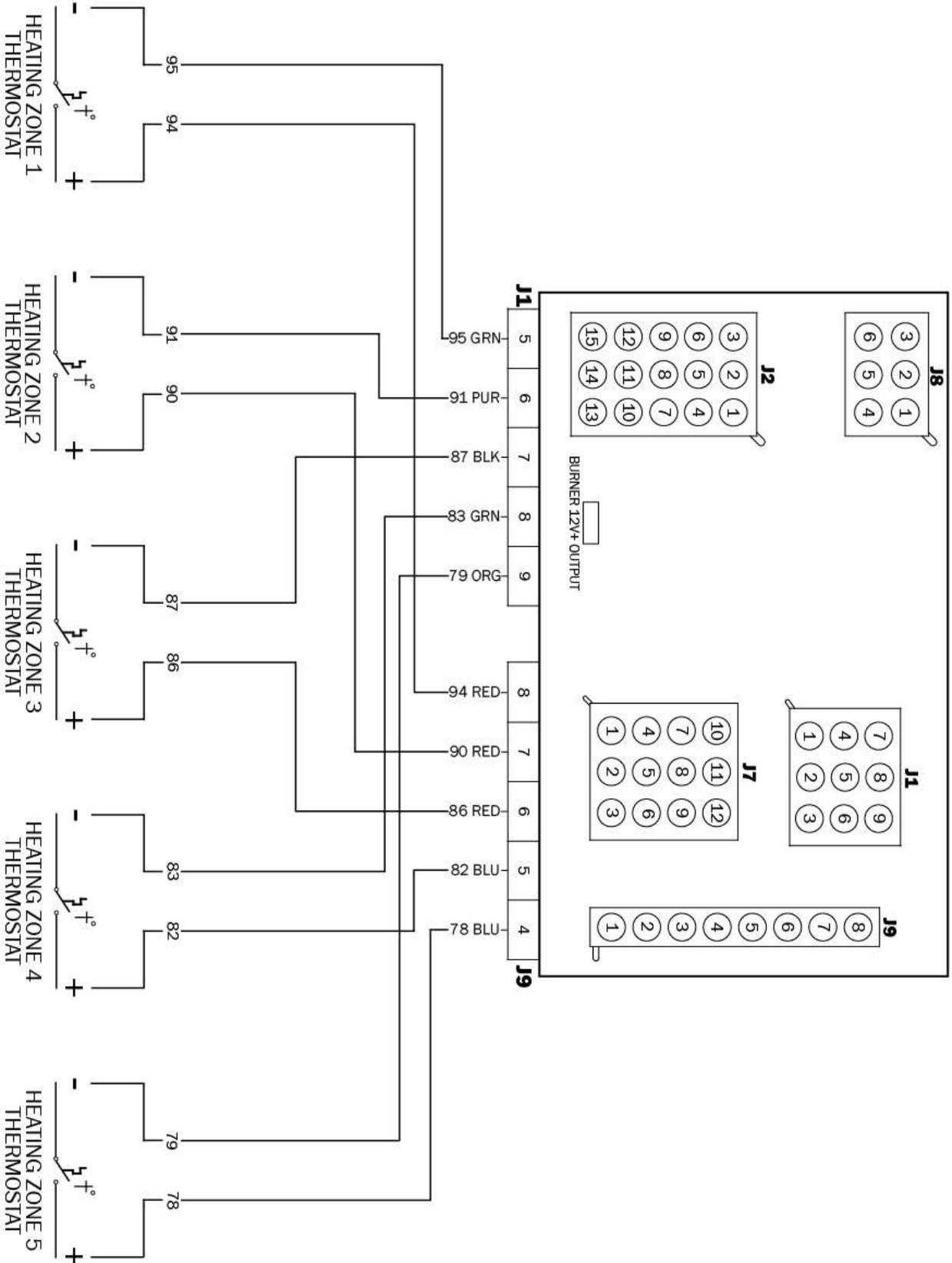
SWITCH PANEL



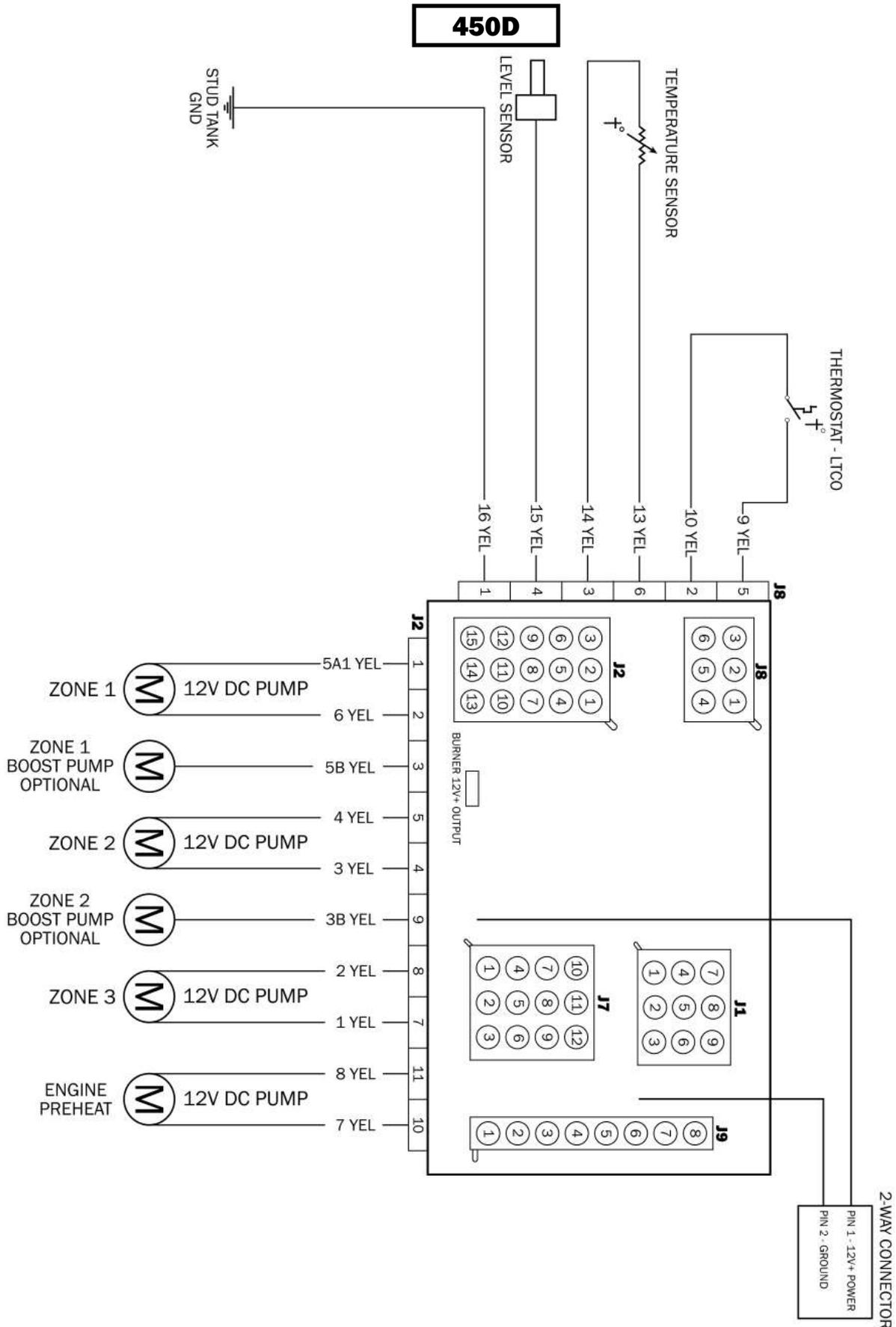
HEAT EXCHANGERS



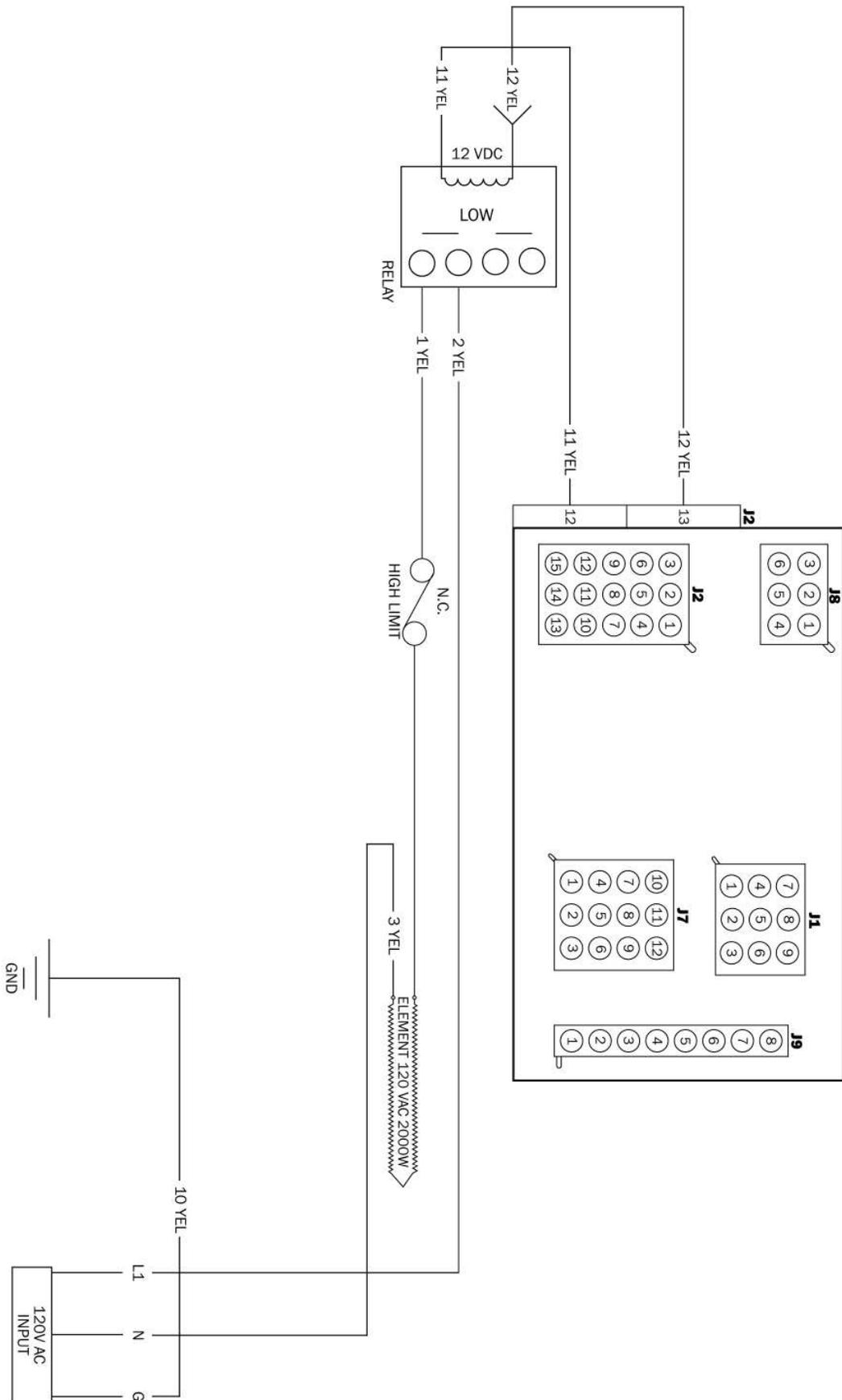
HEATING ZONES

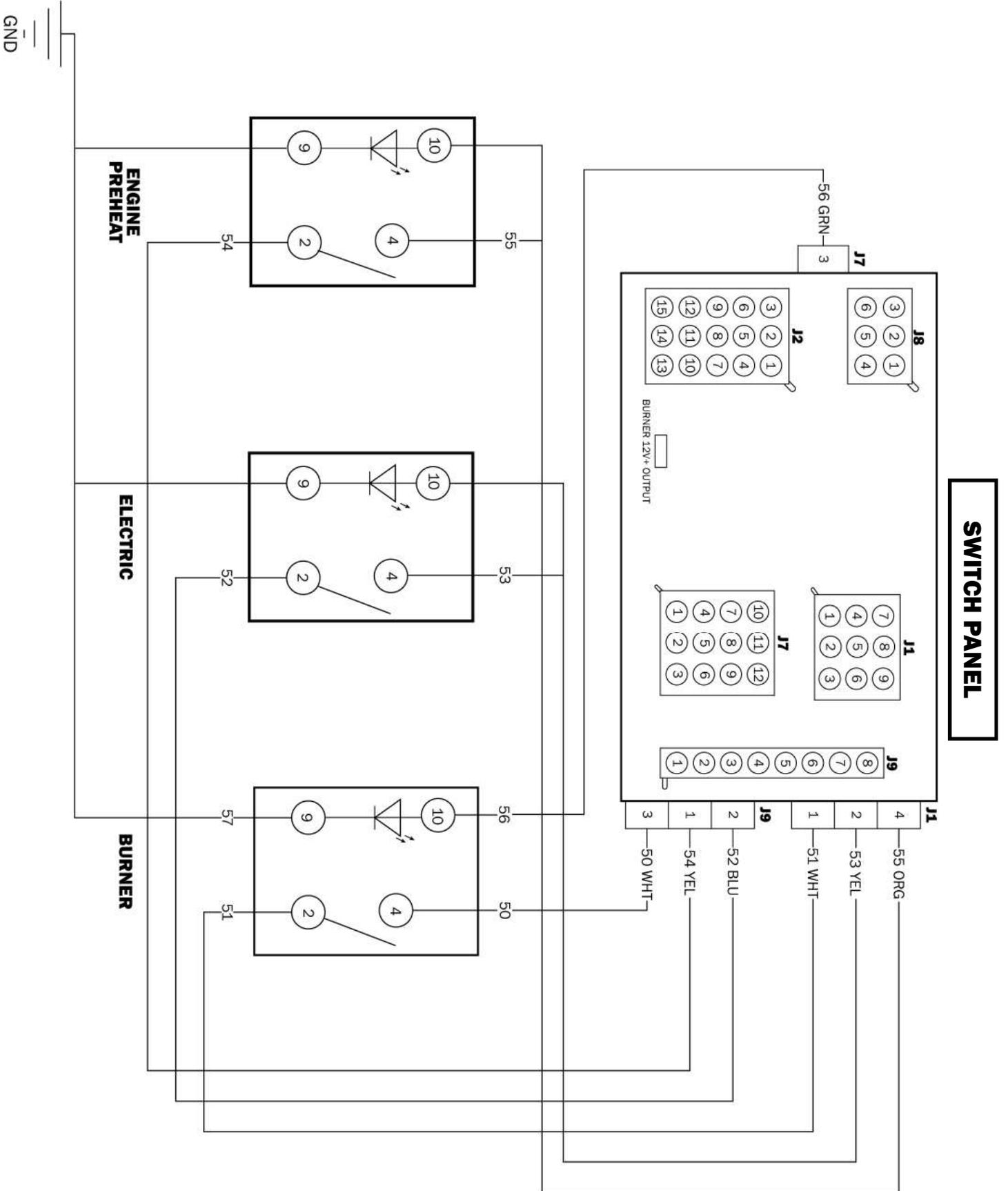


POWER INPUTS, PUMPS, AND SAFETIES

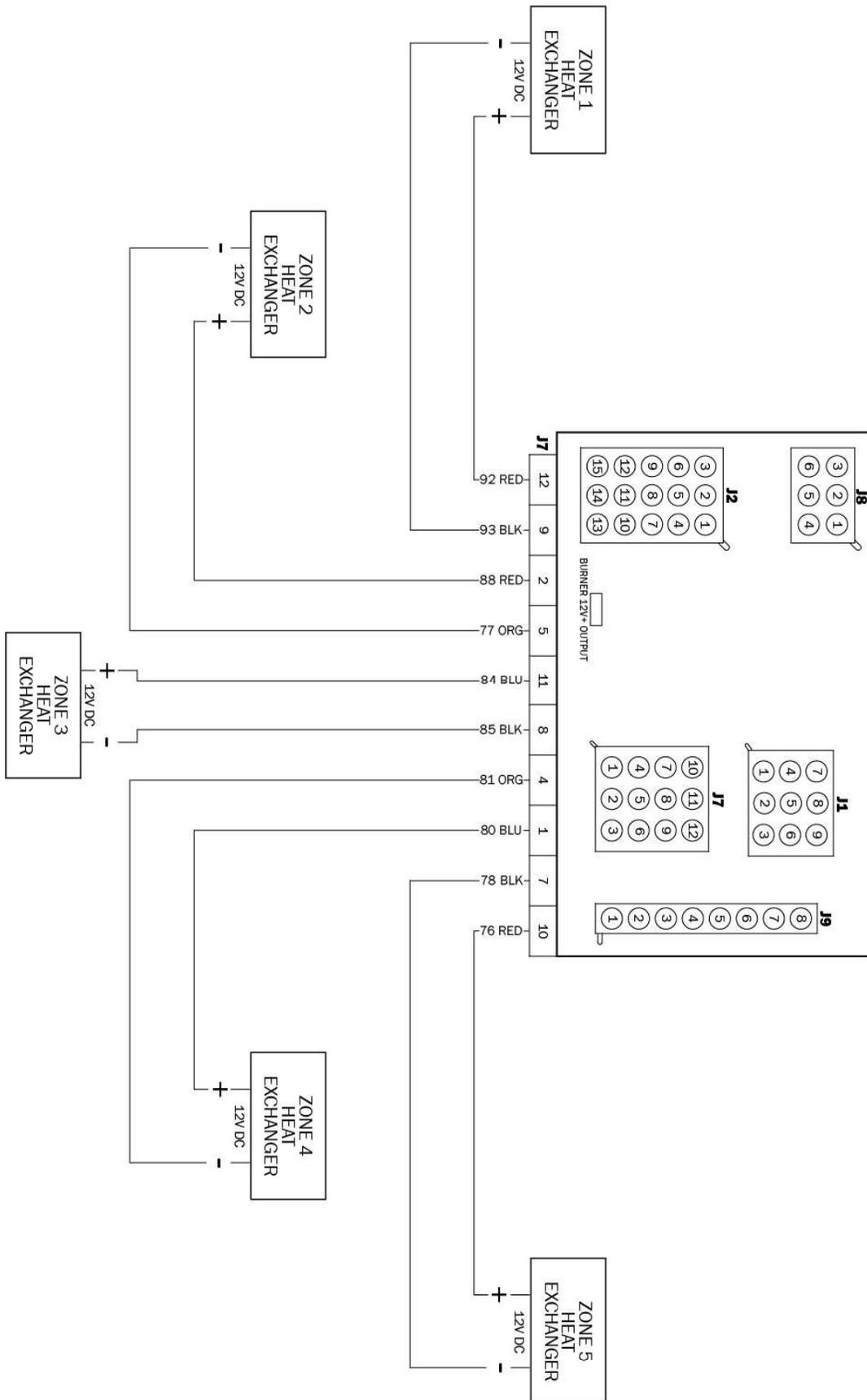


ELECTRIC ELEMENT AND HIGH-LIMIT THERMOSTATS

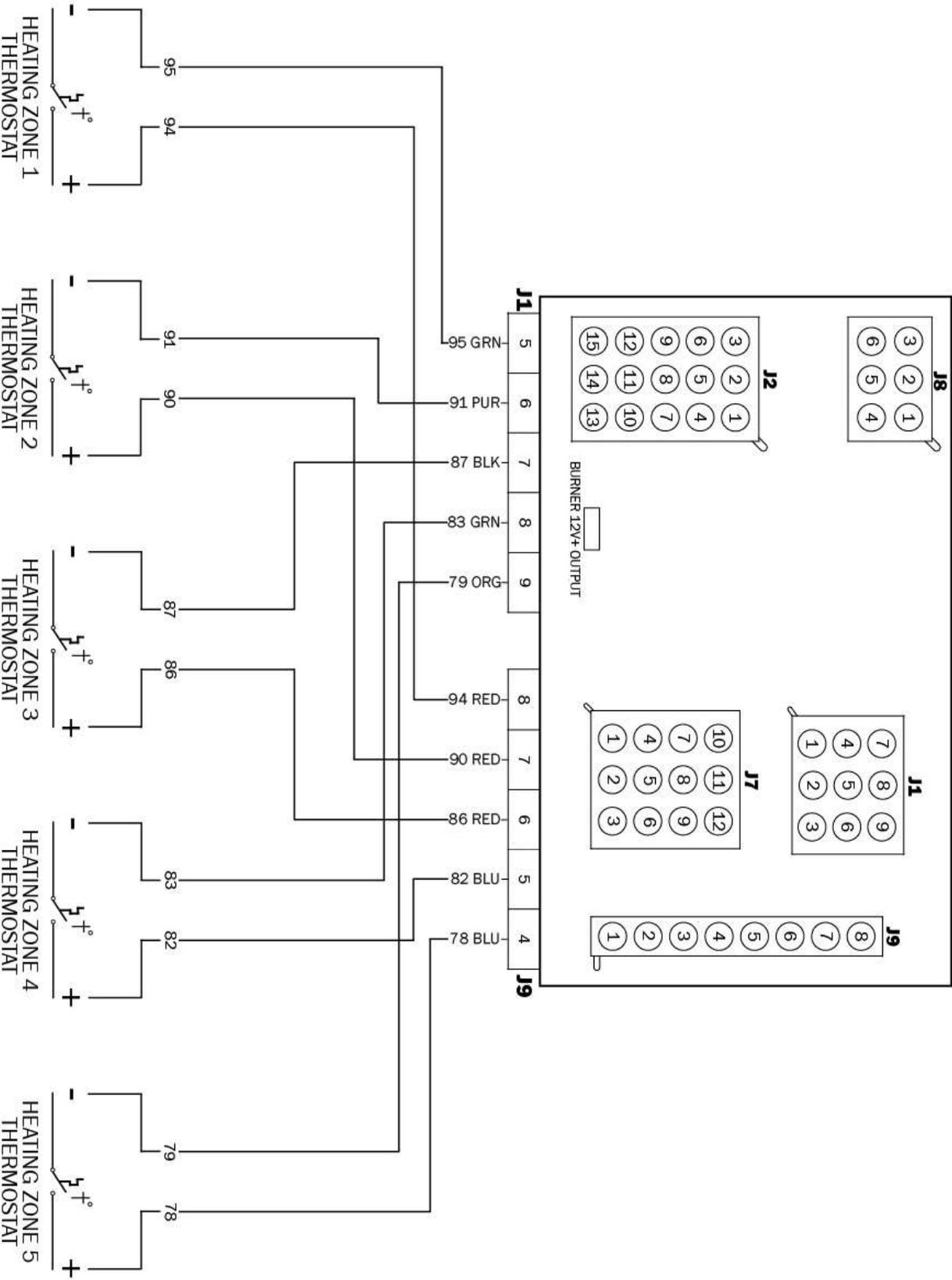


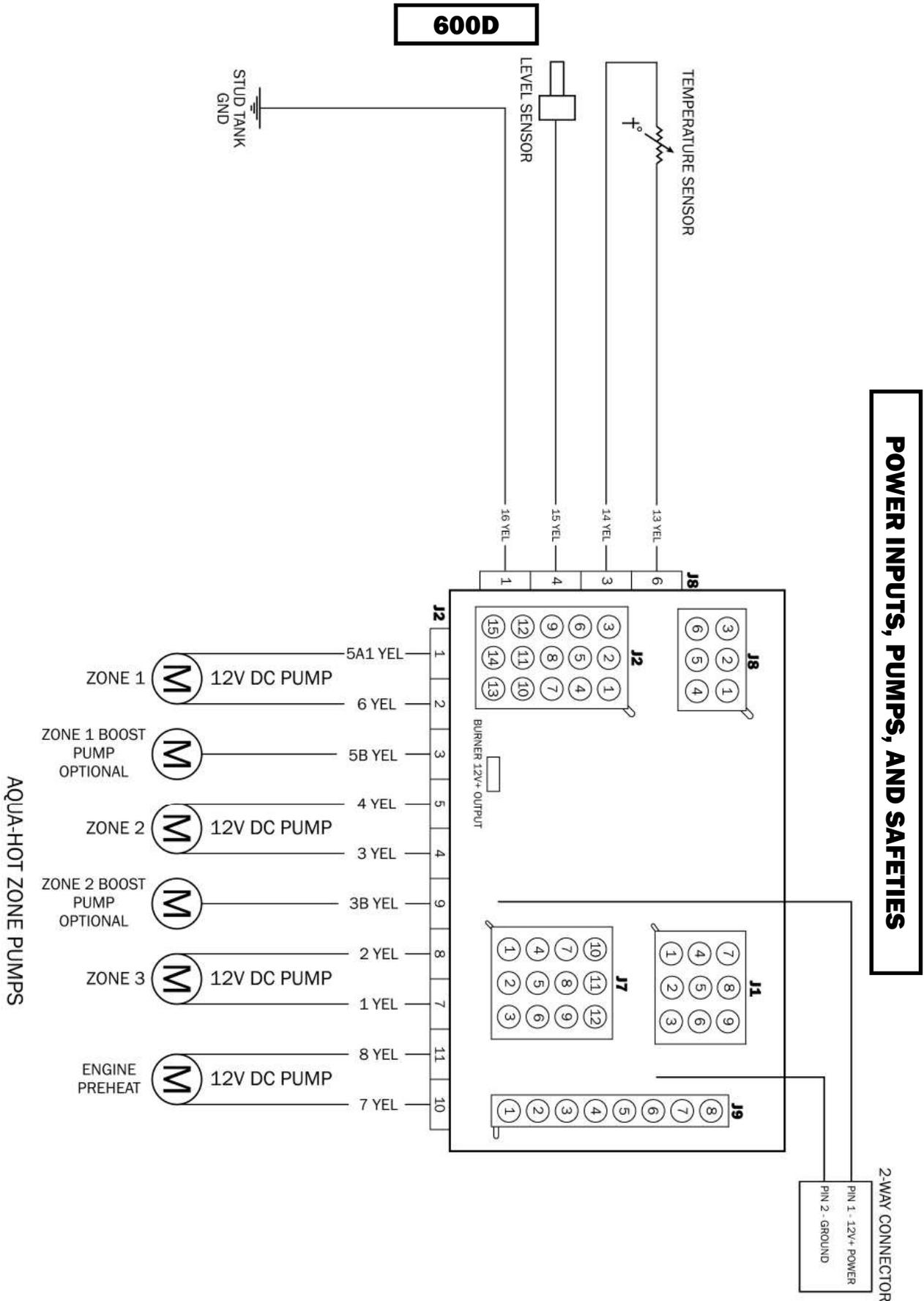


HEAT EXCHANGERS

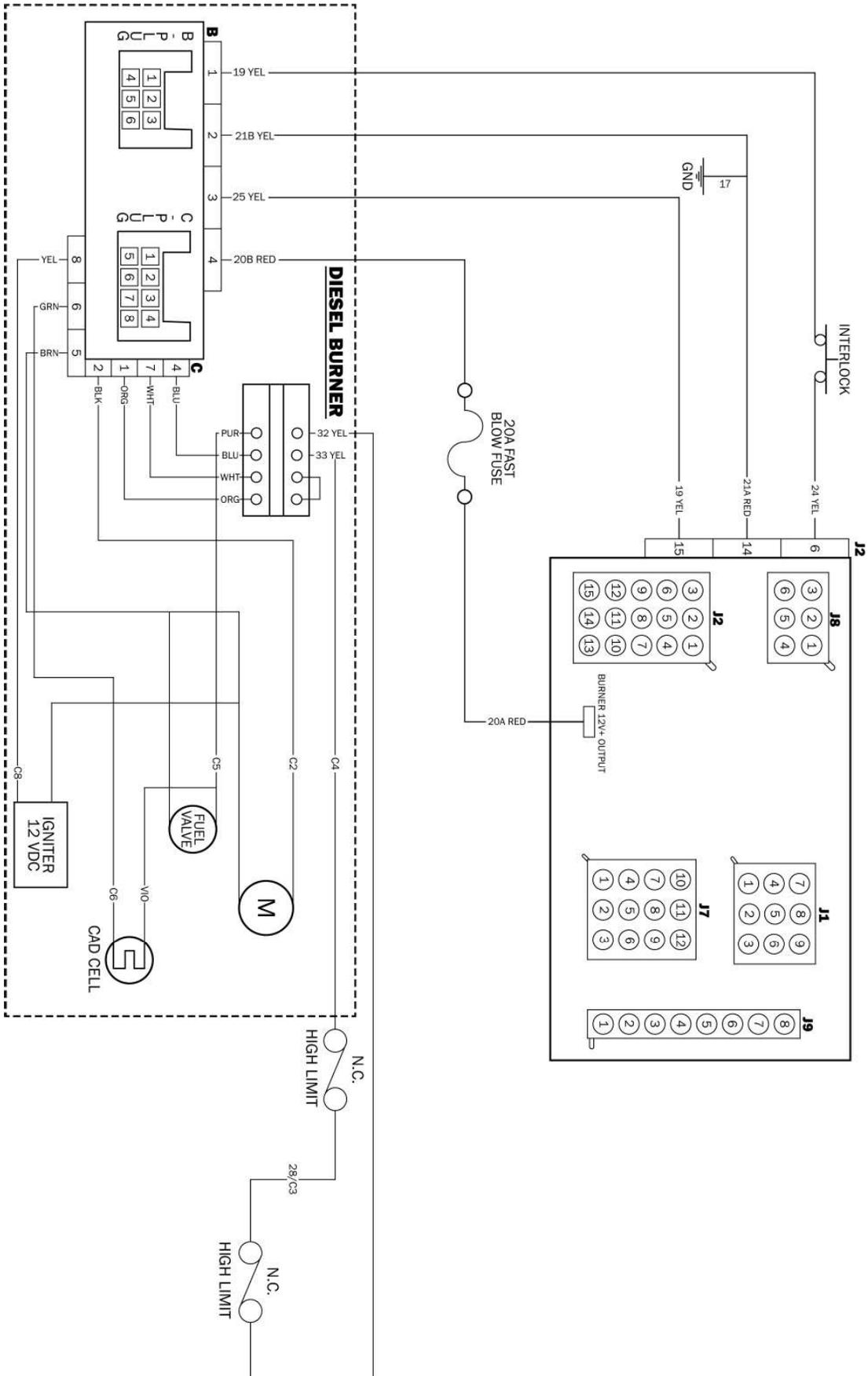


HEATING ZONES

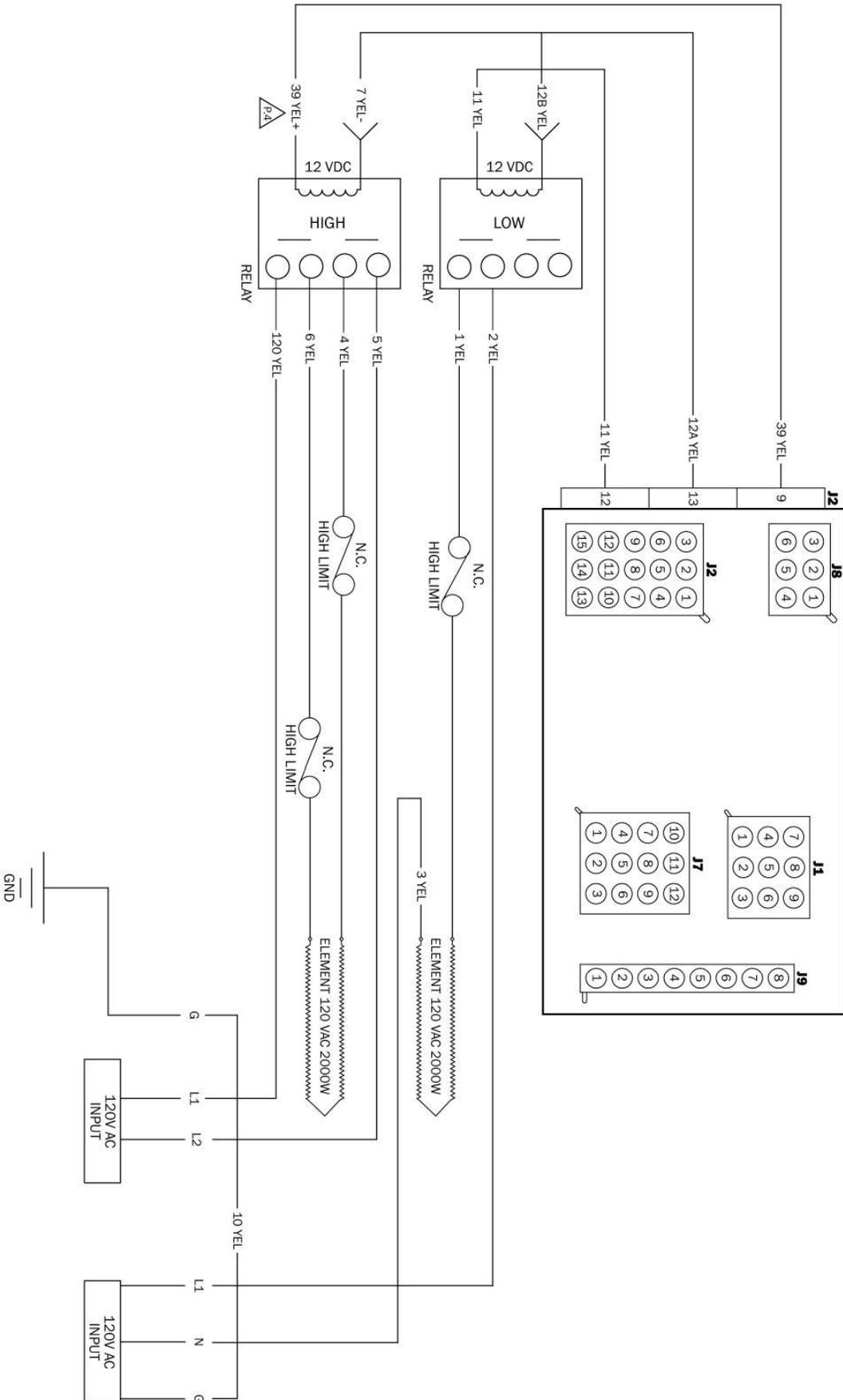




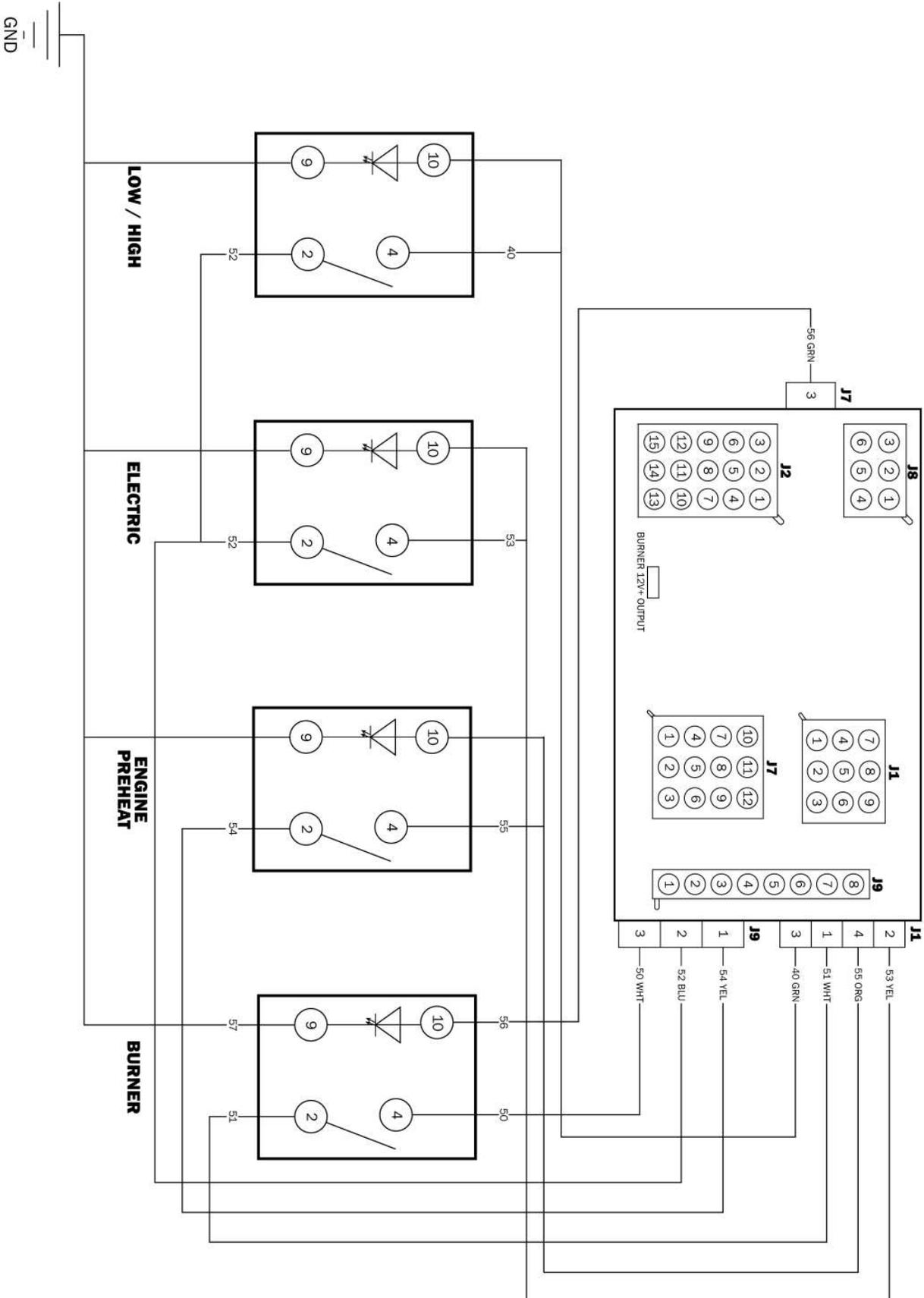
BURNER

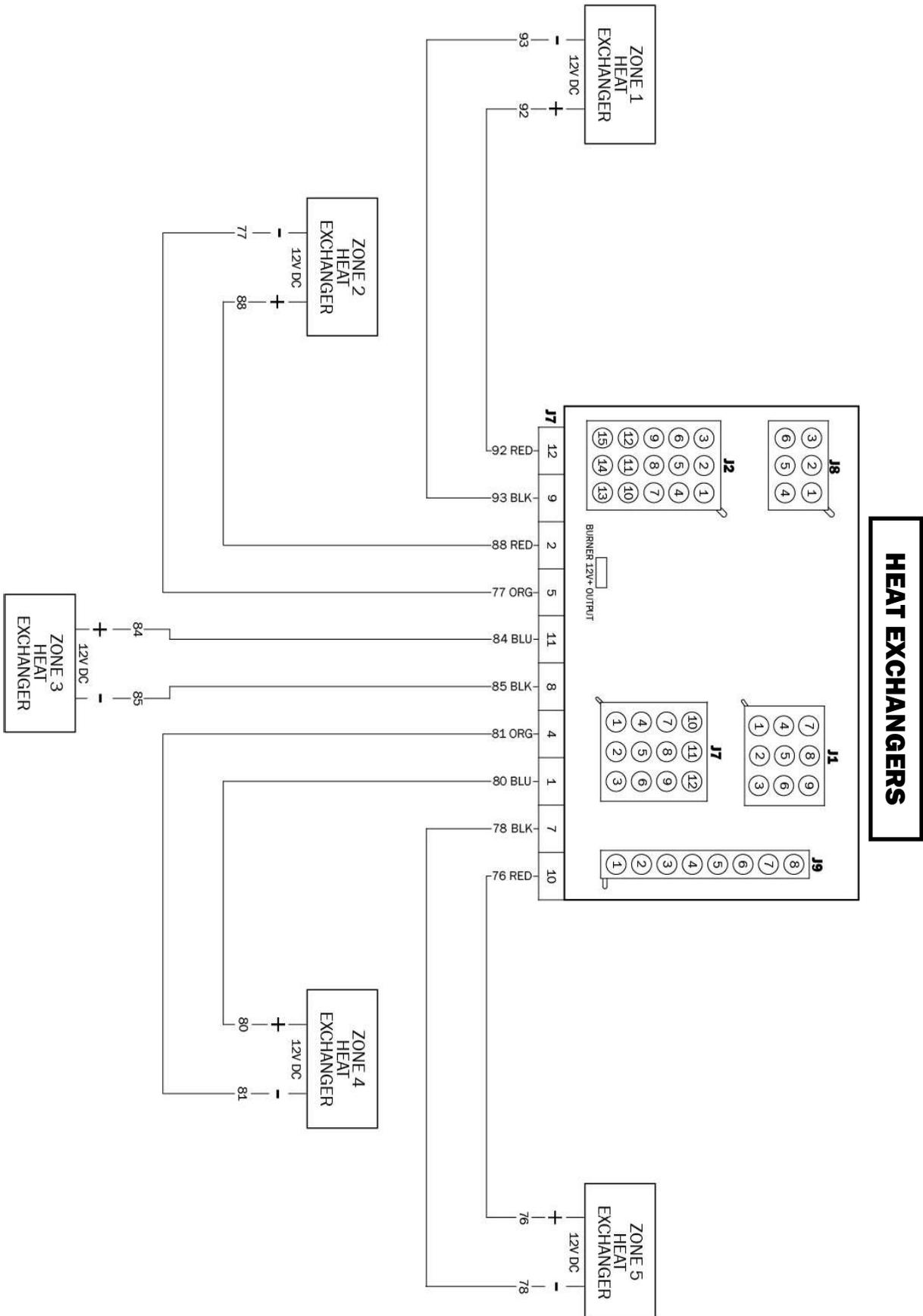


ELECTRIC ELEMENT AND HIGH-LIMIT THERMOSTATS

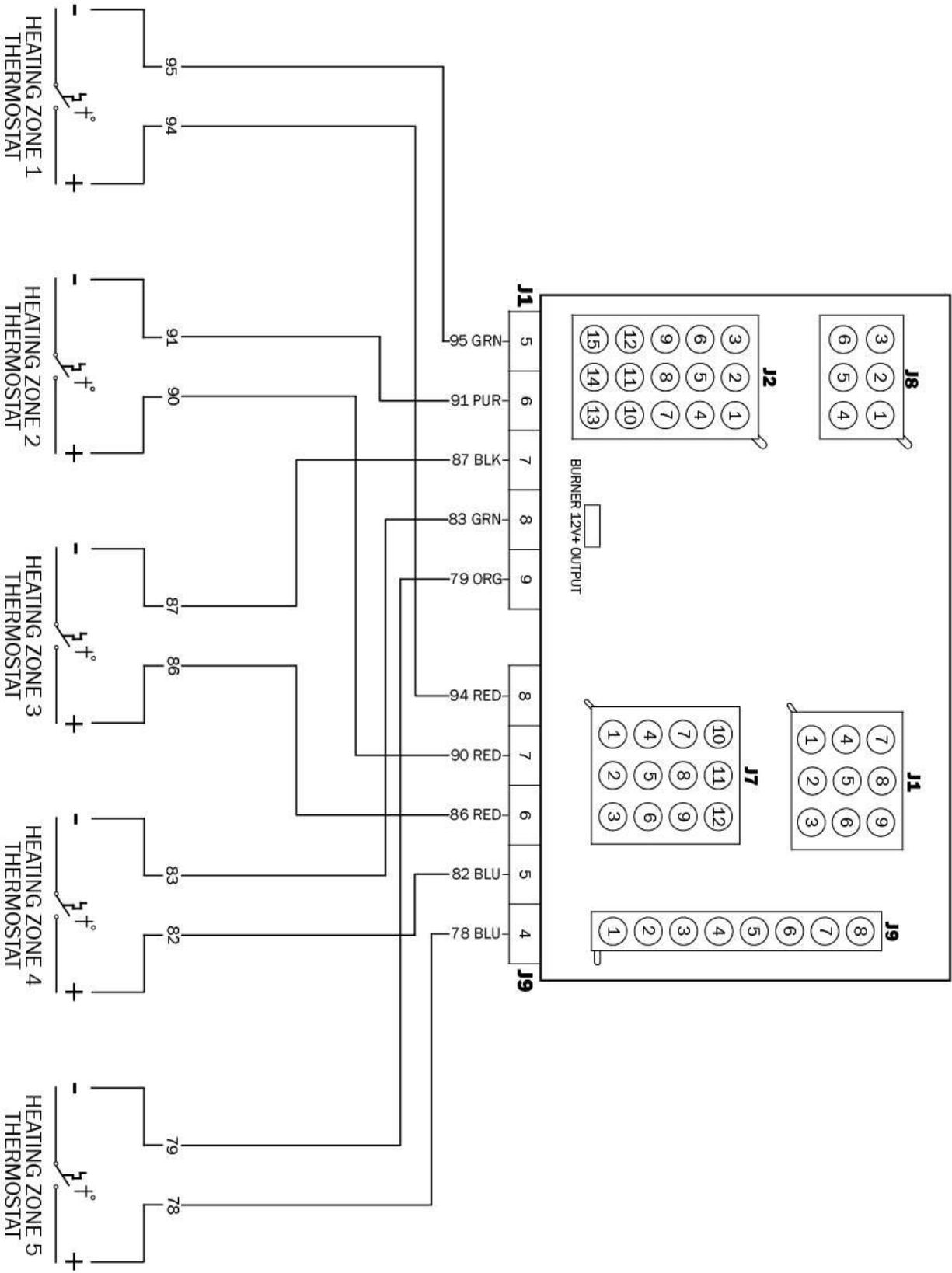


SWITCH PANEL

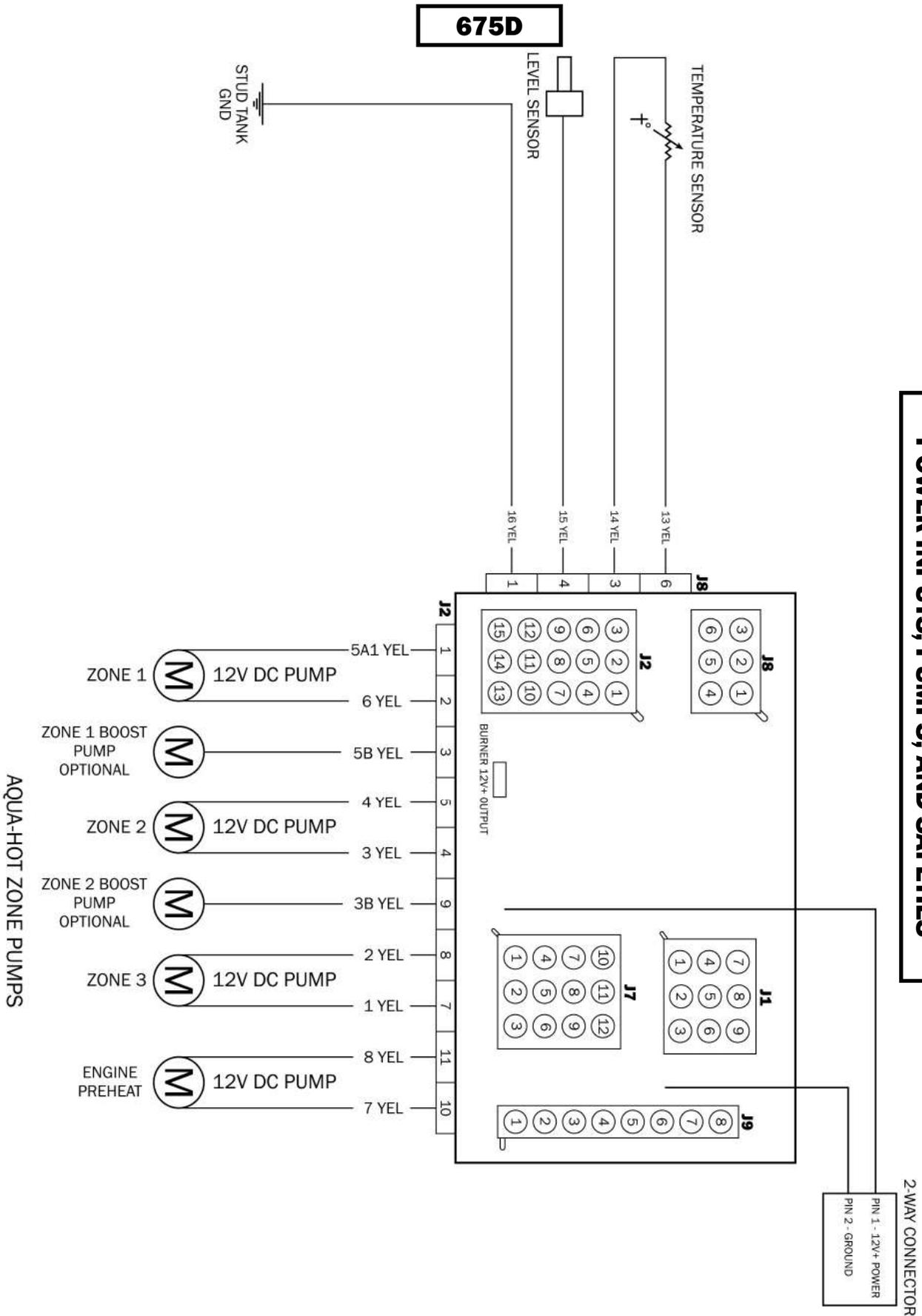




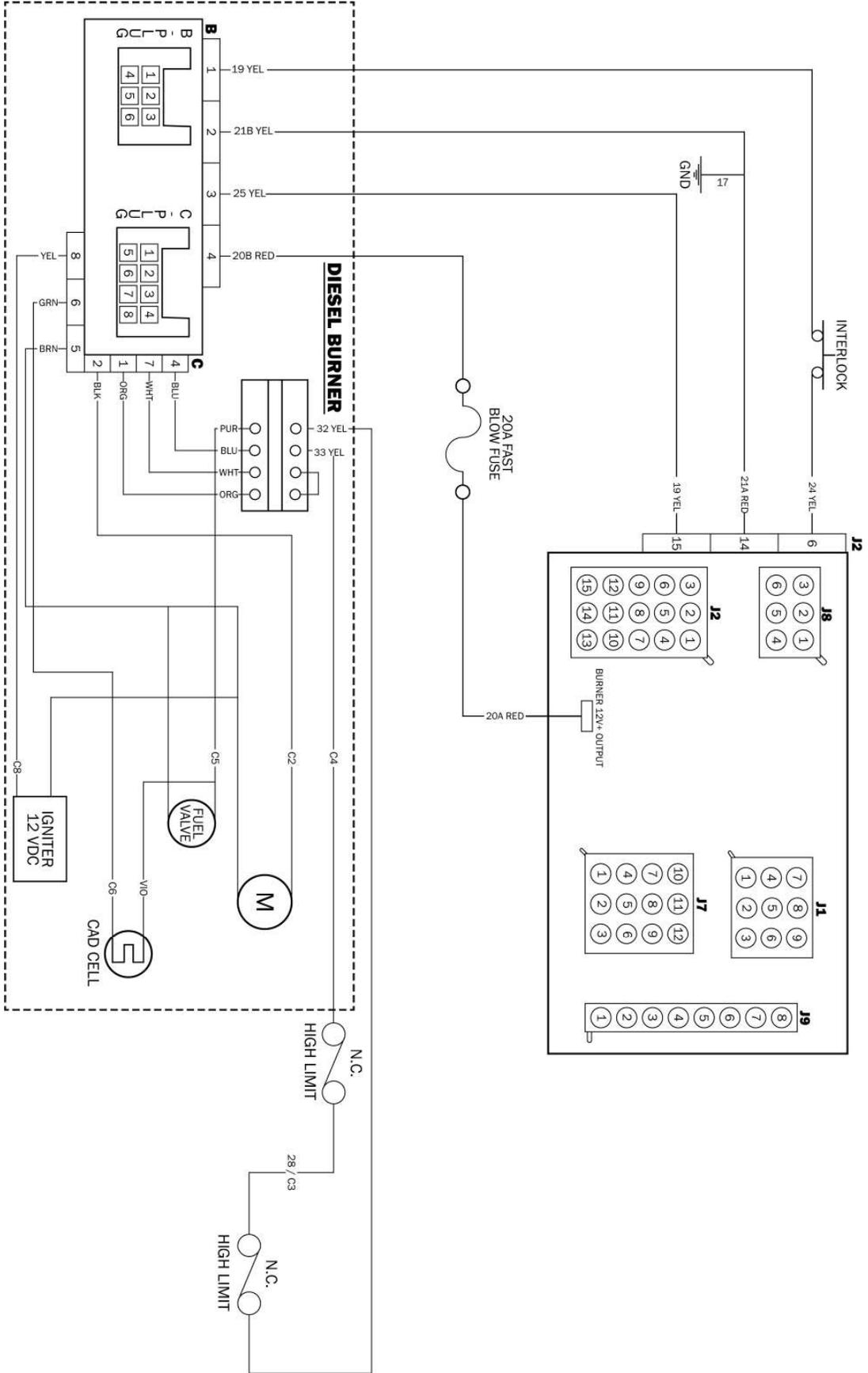
HEATING ZONES



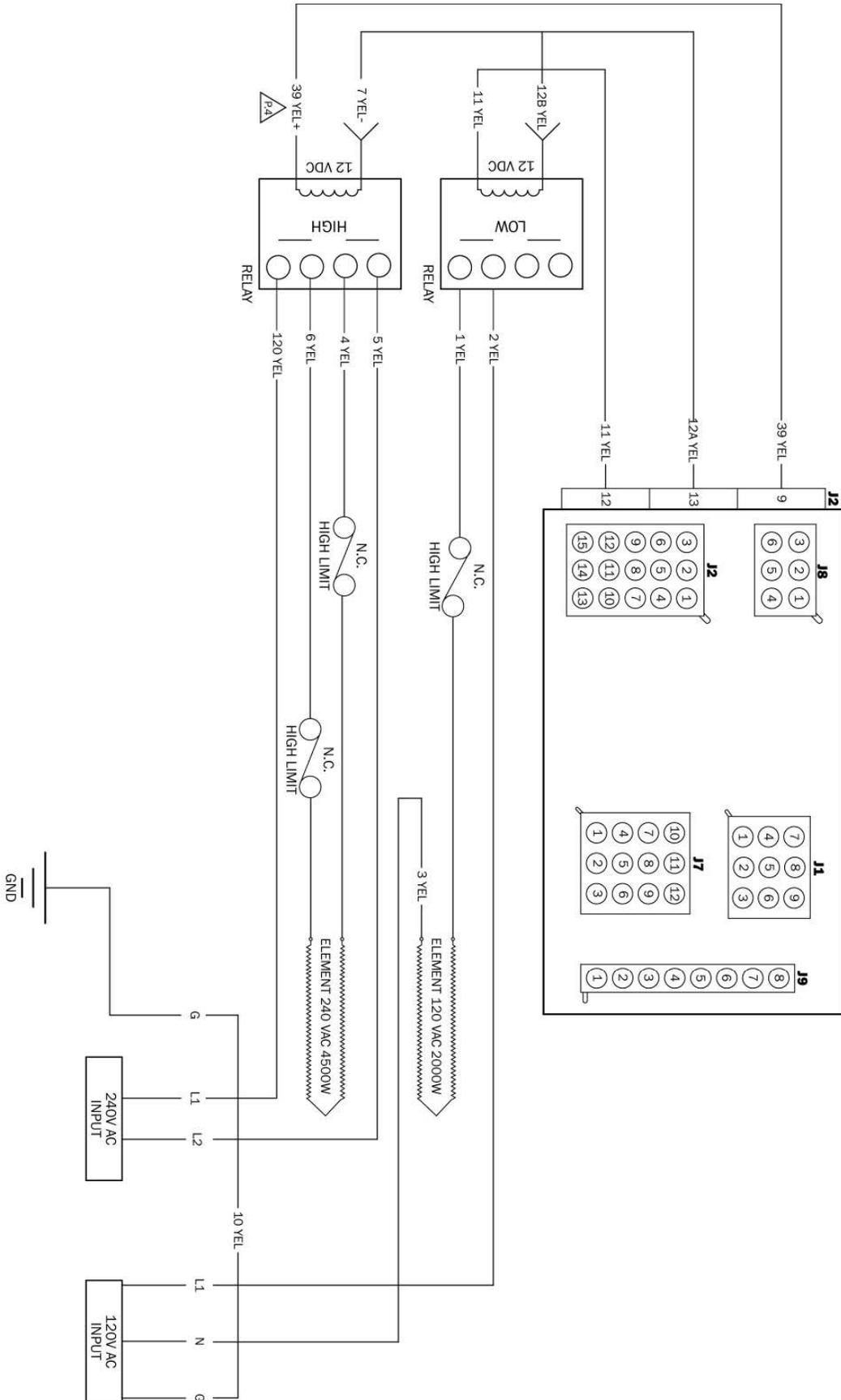
POWER INPUTS, PUMPS, AND SAFETIES



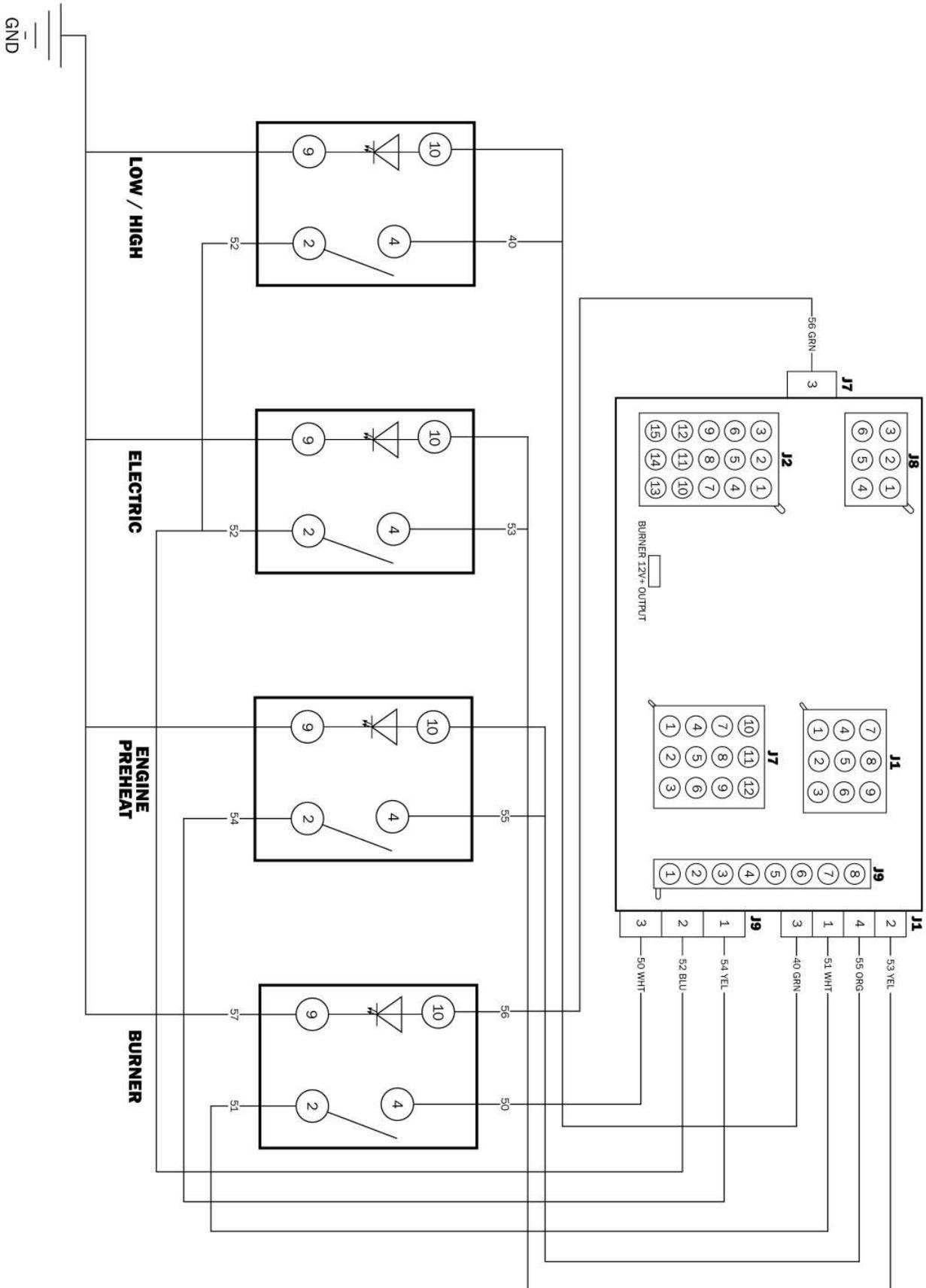
BURNER



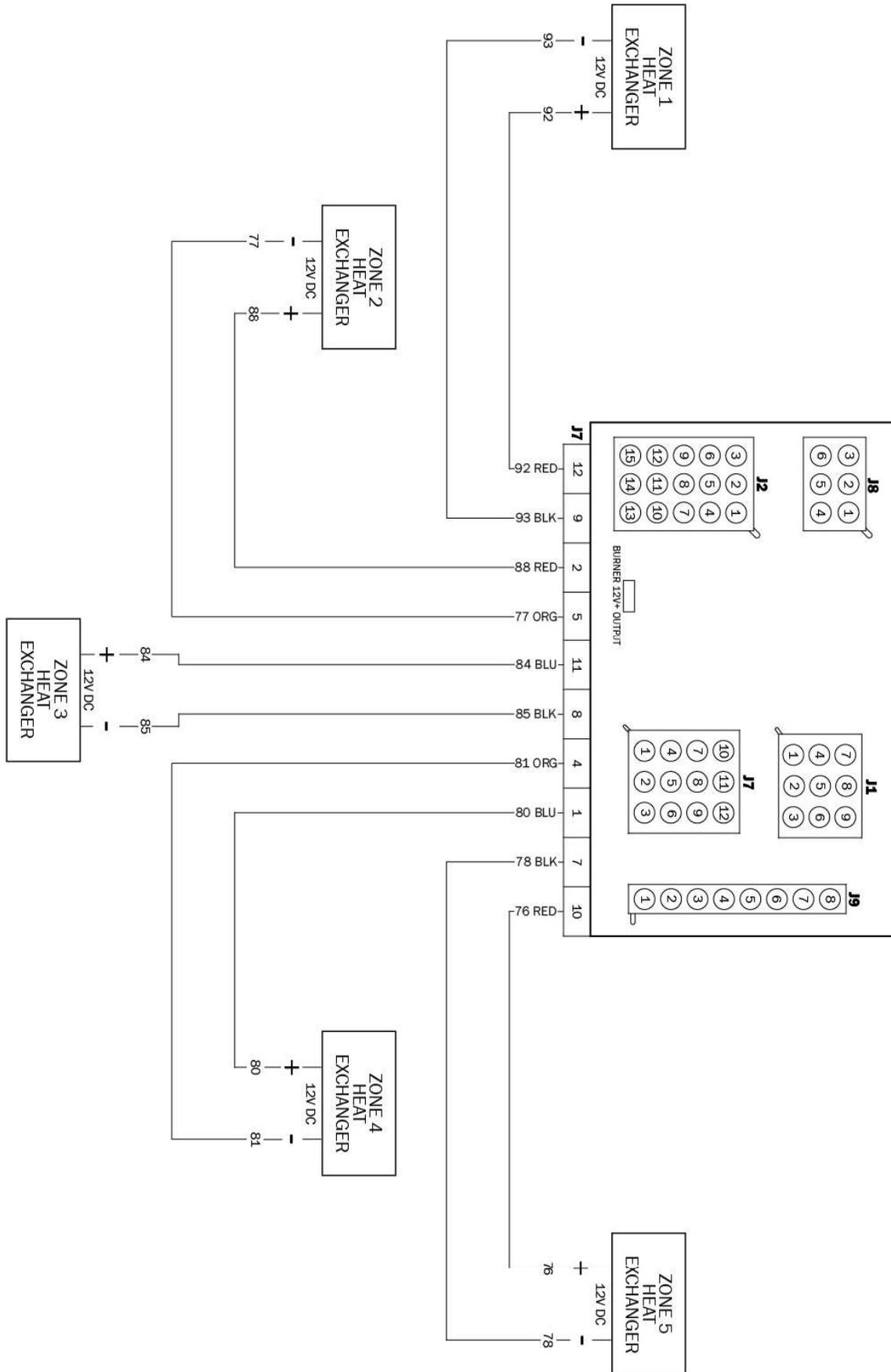
ELECTRIC ELEMENT AND HIGH-LIMIT THERMOSTATS



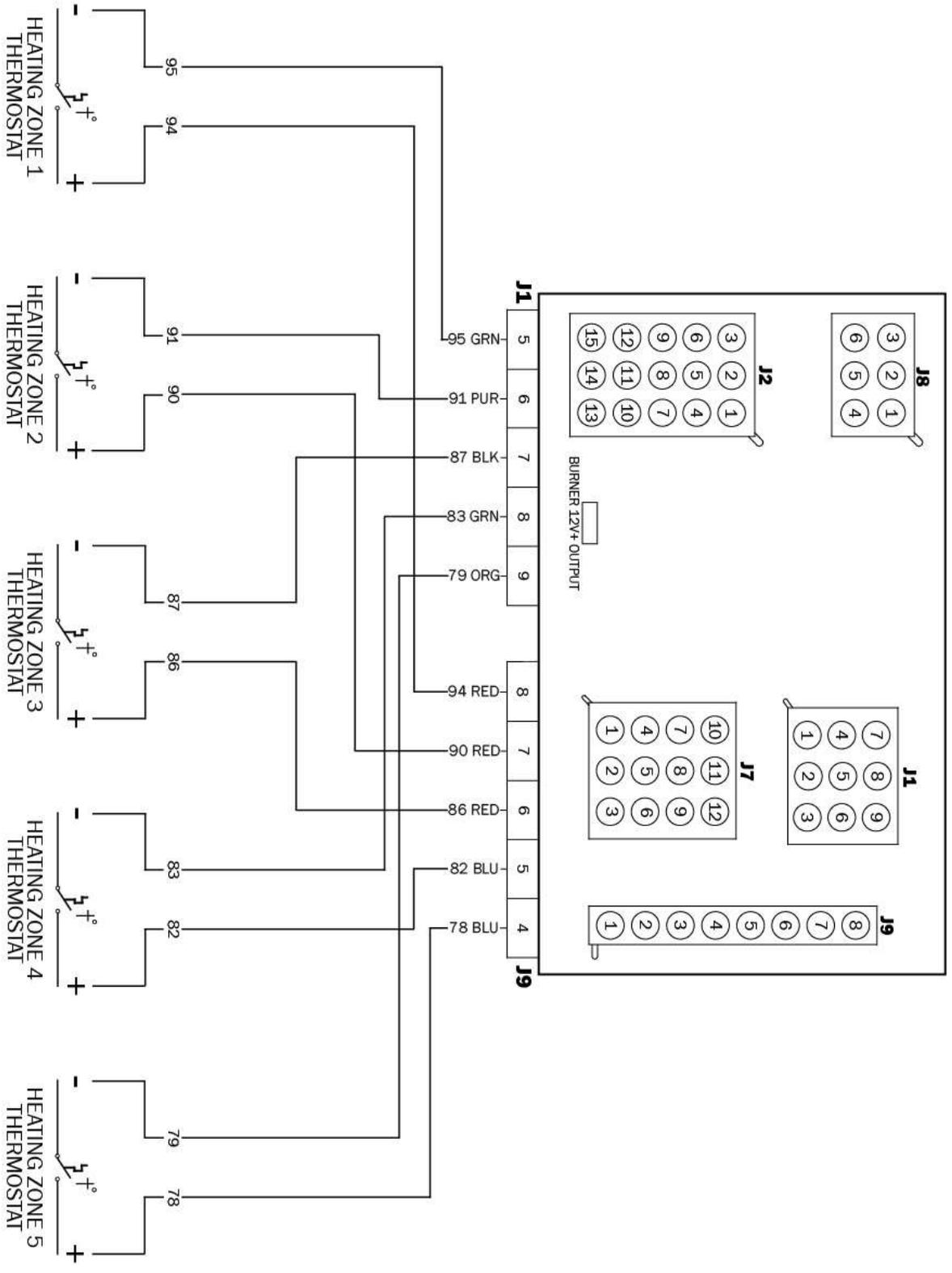
SWITCH PANEL



HEAT EXCHANGERS



HEATING ZONES



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