Electro Industries' Zone Controller

Hydronic System Interface
TS Series Boiler Compatible

Installation & Operating Instructions
Models: EB-ZE*8 and EB-ZT*8

This model is designed and equipped to handle various combinations of zone pumps, various zone valve types, actuators, etc. The one control board has wiring arrangements for all zone operating devices.

A major feature is built-in automatic stage shedding based upon the capacity of each active zone. This compensates for any mixture of large and small zones.

Note: Capacity and SIZE dial switches must be set during installation.

Convenience of an attractive wiring center, all connections at easily accessed terminal blocks, LED's, and simplified zone system installation are also basic to this model.

Special automatic or built-in **shift** to higher water temperature for **priority** zone 1. In many combination temperature installations this feature eliminates mixing valve or injection pump temperature control.

Features

Dual Control Temperature, Priority Zone
Garage Priority Zone Option
Digital or Standard Thermostat Compatible
Compatible with Zone Pumps, Zone Valves (4, 3, 2 Wire Devices), Actuators, Etc.
Fuse Protected, Control Board and Zone Pump Connections
Nineteen Onboard Lights, Each Stat and Zone Output, Diagnostic and Basic Power
Includes Its Own Enclosure
One 120V Hookup Allows For Simple Installation
Remote Data Communication to Boiler Control Board

Drawings: **BH031, BH032, XX017**

DO NOT DESTROY THIS MANUAL. PLEASE READ CAREFULLY AND KEEP IN A SAFE PLACE FOR FUTURE REFERENCE BY A SERVICE TECHNICIAN.

ELECTRO INDUSTRIES
Monticello, Minnesota
800.922.4138
www.electromn.com

Table of Contents

- This product conforms to UL standard 873
- This product conforms to CSA Standard C22,2

Application

- EB-Z*S8
  - Multi-zone high mass hydronic heating system with zone valves and one system pump, interfacing with an Electro Industries' TS Series Boiler.
  - Multi-zone low mass hydronic heating system with zone valves and one system pump, interfacing with an Electro Industries' TS Series Boiler.
  - Multi-zone high mass hydronic heating system with one low mass priority zone, using zone valves per hydronic zone and one system pump, interfacing with an Electro Industries' TS Series Boiler.
  - Multi-zone high mass hydronic heating system with requirement for garage zone isolation, using zone valves and one system pump, interfacing with an Electro Industries' TS Series Boiler.
  - Multi-zone high or low mass hydronic heating system where minimum GPM of smallest zone is less than that required by the chosen Electro Industries' TS Series Boiler, using zone valves and one system pump.
- EB-Z*A8
  - Multi-zone high mass hydronic heating system with zone pumps, interfacing with an Electro Industries' TS Series Boiler.
  - Multi-zone low mass hydronic heating system with zone pumps, interfacing with an Electro Industries' TS Series Boiler.
  - Multi-zone high mass hydronic heating system with one low mass priority zone, using zone pumps, interfacing with an Electro Industries' TS Series Boiler.
  - Multi-zone high mass hydronic heating system with requirement for garage zone isolation, using zone pumps, interfacing with an Electro Industries' TS Series Boiler.
  - Multi-zone high or low mass hydronic heating system where minimum GPM of smallest zone is less than that required by the chosen Electro Industries' TS Series Boiler, using zone pumps.

Utility Load Control Interface

Refer to the installation manual included with the Electro Industries TS Boiler for instruction on dual fuel system interfacing and operation.

Required Accessories – Electro Industries TS Boiler Model Series Boiler

If you are using this zone controller and do not plan on using an Electro Industries' TS Series Boiler, all unique functions detailed in this manual will not apply. Call the factory for more details.

Thermostat:

- High Mass Systems - slab sensing thermostats are always ideal when heating in a high mass (slab of concrete) system. An air sensing thermostat is usually adequate but can cause issues (solar gain).
- Low Mass Systems – low mass systems do not require a slab stat, therefore an air sensing thermostat is ideal.
- Special note with regards to thermostats – this zone controller is not compatible with power robbing thermostats.

Pumps:

- The EB-Z*A8 is compatible with any 120V pump. It is the job of the installing contractor to properly size the pump(s) for the application.

Zone Valves:

- The EB-Z*S8 is compatible with any 2, 3 or 4-wire zone valve or zone actuator.

Basic Product Description

The concept behind the Electro Industries Zone Controller is threefold:

Number one – to simplify wiring in hydronic heating applications which include an Electro Industries hot water boiler and multiple heating zones (thermostats). Having all your low and high voltage wiring in one central location is very important and time saving.

Number two – to allow for constant and precise system monitoring. Included LED's will always be there to represent current system status as well as display errors within the system. This is a great tool to use in system diagnosing and troubleshooting.

Number three – to allow the boiler to work in ways that are very specific to your application. Features such as dual temperature priority, garage priority and Btu/h per zone dials make this a truly unique and customizable system

Placement & Mechanical Information

Locate the unit on a dry indoor wall near the Electro Industries' TS Series Boiler. There are 4 mounting holes in the rear of the Electro Industries Zone Controller. Using proper fasteners (not provided), and utilize these mounting holes to secure the cabinet to the wall of the structure.

Safety Consideration

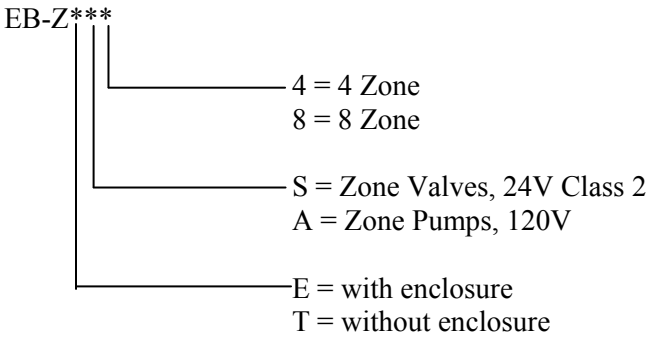
⚠ WARNING

BEFORE PERFORMING SERVICE OR MAINTENANCE OPERATIONS ON A SYSTEM, TURN OFF MAIN POWER SWITCHES TO THE INDOOR UNIT. IF APPLICABLE, TURN OFF THE ACCESSORY HEATER POWER SWITCH. ELECTRICAL SHOCK COULD CAUSE PERSONAL INJURY.

Installing and servicing boilers, electric heating and heat pump equipment can be hazardous due to system pressure and electrical components. Only trained and qualified service personnel should install, repair or service heating and air conditioning equipment. Untrained personnel can perform the basic maintenance functions of cleaning coils and cleaning and replacing filters. All other operations should be performed by trained service personnel. When working on heating and air conditioning equipment, observe precautions in the literature, tags and labels attached to the unit and other safety precautions that may apply, such as the following safety measures:

- Follow all safety codes.
- Wear safety glasses and work gloves.

Product Configurator



Specification Table

Electrical Data

Model	Voltage	Static Amps	Maximum Load Amps*	Maximum Source
EB-Z*A8	120	0.02	8.6	10
EB-Z*S8	24†	0.1	3.7	5.0

*Application/field installation determines zone controlling components activated by this controller.
†Field supplied Class 2 transformer.

Installation Requirements

1. All installation work must be performed by trained, qualified contractors or technicians. Electro Industries sponsors installation and service schools to assist the installer. **Visit our Website at www.electromn.com for upcoming service schools.**

⚠ WARNING

ALL ELECTRICAL WIRING MUST BE IN ACCORDANCE WITH NATIONAL ELECTRIC CODE AND LOCAL ELECTRIC CODES, ORDINANCES, AND REGULATIONS.

⚠ WARNING

OBSERVE ELECTRIC POLARITY AND WIRING COLORS. FAILURE TO OBSERVE COULD CAUSE ELECTRIC SHOCK AND/OR DAMAGE TO THE EQUIPMENT.

⚠ CAUTION

This unit can only be used for its intended design as described in this manual. Any internal wiring changes, modifications to the circuit board, modifications or bypass of any controls, or installation practices not according to the details of this manual will void the product warranty, the safety certification label, and manufacturer product liability. Electro Industries cannot be held responsible for field modifications, incorrect installations, and conditions which may bypass or compromise the built-in safety features and controls.

2. At Electro Industries the safety of the installer and the end user is of highest priority. Remember, safety is the installer's responsibility and the installer must know this product well enough to instruct the end user on its safe use. Professional installers should be trained and experienced in the areas of handling electrical components, sheet metal products, and material handling processes. Use them.

Installation Overview, Required System Components

The Electro Industries Zone Controller contains the interface controller, an enclosure and a system transformer. Based on the application, many other system components may be required to make your system operate as desired. These components must be provided by the installing contractor. Referenced components may include but are not limited to:

- An Electro Industries TS Boiler
- System pumps
- Expansion tank and air eliminator
- Hydronic valves and piping
- Thermostats
- Wiring
- System transformer
- Pump relays
- Zone valves
- See HX101 for more ideas on typical components required in multiple zone hydronic heating applications

⚠ WARNING

HX101 SHEETS ARE SUGGESTED AND CONCEPT DRAWINGS. INSTALLER IS RESPONSIBLE FOR ALL EQUIPMENT, ADDITIONAL COMPONENTS, AND DETAILING REQUIRED BY LOCAL CODES.

Mechanical Installation Overview

Zone Controller Interfacing Comments – Non-Electro Products
The EB-Z*** zone controller special functions described in this manual are only active when used with an Electro Industries' TS Series Boiler. If using this zone controller with a non-TS Boiler it must be noted that the special functions are not active (Btu/h dial and dual temperature). If interfacing this zone controller directly to another boiler brand (fossil fuel boiler or brand X electric boiler), the spade terminals labeled "END SW" represent an isolated switch and can be used to communicate room thermostat heat demand to a non-TS boiler.

The Electro Industries TS Boiler line includes the following boiler model numbers:

- Midsize Boiler Series – EB-M*
- TS Standard Boiler Series – EB-S or EB-W*
- Commercial Boiler Series – EB-C*

Dual Fuel Boiler Comments:
If the Electro Industries Boiler is being used in a dual fuel application, it must be noted that this zone controller will send hot water to correct calling zone (thermostat) as well as prioritize based on zone controller setting while in standby (non-electric heating mode). It will not, however, communicate dual temperature requirements or BTU per zone dial functions to the standby boiler. This is simply not possible.

Multiple Electro Industries Boilers - Use EB-C-STG5 Staging Relay
This unique staging relay allows multiple Electro Industries TS Boilers to easily interface and operate as one boiler. Special EB-Z*A8 setup parameters are required with such an application. See paragraph in this manual **Multiple Boilers, Using EB-C-STG5 Staging Relay** for further details.

Electrical Hookup

Installation/Hookup – EB-Z*A8

1. This model has its own enclosure with 40VA transformer.
2. **Transformer power** – internal transformer has primary taps for 120, 208, 240 volts, 60 hertz, single phase. Route appropriate source to left compartment and connect to transformer wires. Cap off the unused transformer wires.
    a. 120 – black and white.
    b. 208 – black and red.
    c. 240 – black and orange.

    Note: This Transformer will be factory wired for 120V primary. Simply connect an external 120V source to the provided three place block (L1, N & G). The secondary side of this transformer is also factory connected to the zone controller..
3. A common connection or wire is required between a main boiler C tab and the C tab on the zone controller board.
4. Connect a 4-wire thermostat cable between the terminal block marked REMOTE and the same terminal block on the Electro-Boiler control board. This must be point to point, V+ to V+, etc.

Installation/Hookup – EB-Z*S8

1. This model has its own enclosure.
2. An **externa**l 24VAC power source is required.
3. On the bottom left side of the EB-Z*S8 zone controller are five spade tabs which are used for low voltage power connection. Connect the 24VAC wire from your field provided transformer to one of the spade tabs labeled “24VAC” and connect the common wire from the field provided transformer to one of the tabs labeled “C”. This will provide low voltage power from the field provided transformer to the zone controller once primary source power is applied to the transformer.
4. A common connection or wire is required between a main boiler C tab and the C tab on the zone controller board. Reference BH031 page 1.
5. Connect a 4-wire thermostat cable between the terminal block marked REMOTE and the same terminal block on the boiler control board. This must be point to point, V+ to V+, etc.

Installation/Hookup – Thermostat – Hookup Drawing BH031

1. Connect slab stat or temperature sensing **thermostat** to the top 24VAC hot or “R” junction and the thermostat heat call or “W” to terminal block. If using Electro-Stat, a common is required at each Electro-Stat. Common is available at the top right terminal block.
2. If using priority high temperature feature, zone 1 and connected stat 1 must be the high temperature zone.
3. If using priority garage feature, zone 8 must be the garage zone.

24-Volt Motor/Actuators – Reference Hookup Drawing: BH032

1. Connect the output terminals (1-8) to their corresponding zone actuator motor per thermostat setup. Example, thermostat zone “1” will energize output terminal 1 when thermostat is actively calling for heating. This output terminal will go to 24VAC when thermostat is calling.
    Note: This model zone controller has no provisions for zone valve “end switch” connection/monitor.
2. Connect a circuit board terminal C wire to all common points of the zone actuator motors common.
3. Note the transformer within the Electro-Boiler can be used for systems which include up to (3) zone valves or zone actuators. In applications where there are more than 3 zone valves or zone actuators, you must size and provide your own transformer.

Installation/Hookup – Zoning Pumps – Reference Hookup Drawing: BH031

1. Connect the output terminal (1-8) to their corresponding zone pump L1 connection. Example, thermostat zone “1” will energize output terminal 1 when thermostat is actively calling for heating. This output terminal will go to 120VAC when thermostat is calling.
2. The common or neutral of each zone pump is tied together back to the “neutral” terminal on the zone controller.

Boiler Circulator/Pump Information
The pump connection and operation to the main boiler depends upon the zone arrangement detailed in the previous section.

1. With zone pumps, you do not use or wire to the zone pump terminal block in the boiler itself.
2. If it is zone valves, the single pump will receive its contact closure from the terminal block within the boiler itself.

Thermostat Heat Anticipator Setting
The two thermostat screw terminal contacts match to fixed 650-ohm load. Set the anticipator to 0.2 or less.

Additional Hookup or Special Equipment Concerns

Priority auxiliary contacts:
In applications where the dual temperature priority function is being utilized, it should be noted an auxiliary set of contacts is provided which changes state when there is an active priority call. This set of contacts can be useful in applications where the dual temperature priority zone signal is needed elsewhere.

See upper left corner of the zone controller labeled “PRIORITY AUX”.

NOTE: This switch only pertains to the dual temperature / priority zone (zone 1). It does not follow the GARAGE priority function (zone 8).

Heat call end switch contacts:
In applications where an isolated (dry switch) is required to communicate the status of system heat demand (thermostat call for heat) elsewhere in the system, the terminals labeled “END SW” can be used.

Logic:
No heat call (room thermostat) = “END SW” contacts open
Active heat call (room thermostat) = “END SW” contacts closed

Power robbing thermostat comment:
As stated multiple times in this installation manual, this zone controller is not setup to interface with power robbing thermostats. If you should find yourself in a scenario where the installation is complete and power robbing thermostats were used but cannot be replaced, it should be noted that a .5W 1k Ω load resister can be field installed to allow for this application. This can be achieved by placing the resister in parallel with each thermostat “W” (to “C”) wire.

Field Setup or Programming

Setup – Zone Sizes and Boiler Stage Sizes
On the EB-Z**8 zone controller board there are 9 dial switches. **Eight** relate to **each zone** and **one** relates to boiler **size** information. If all eight zones are not present or used, set the unused dials to 0. From building design information and/or zone capacity calculations, installer must know the approximate Btu/h capacity of each zone.

Dial in this capacity for each zone:

0 = 15,000 Btu/h
1 = 30,000 Btu/h
2 = 45,000 Btu/h
3 = 60,000 Btu/h

The 9th dial switch must be set to the boiler **size**.

Model Boiler Size Dial Switch Position Zone Dial Switch Multiplier

Model	Boiler Size	Size Dial Switch Position	Zone Dial Switch Multiplier②
EB-*-10	10 kW	A	1
EB-*-13	13 kW	A	1
EB-*-15	15 kW	B	1
EB-*-18	18 kW	B	1
EB-*-20	20 kW	C	1
EB-*-23	22.5 kW	C	1
EB-*-27	27 kW	D	1
EB-C-27-*	27 kW	D	1
EB-C-40-*	40.5 kW	D	1
EB-C-31 & -36	31 or 36 kW	D	2
EB-C-18-48	18 kW	C	1.4
EB-C-36-48	36 kW	D	1.4
EB-C-54-48	54	D	1.4

Notes

1. When in priority (dual temperature of garage), all stages of the boiler are enabled and the above is bypassed.
2. When using this to switch the EB-C-** boiler, the BTU settings next to the stat input dial switch may need to relate a different value. This column represents a multiplier times the dial switch setting BTU value. Example, for the 54 kW boiler – 0 position dial switch (15,000) now really represents 15,000 x 1.4 = 21,000.
3. Position E is not used. F, G, and H relate to multiple boilers.

Multiple Boilers, Using EB-C-STG5 Staging Relay

It is assumed the zoning arrangement has one or two small zones which can be handled by the first boiler and primarily large zones which will require stepping up to the next boilers. There are three boiler **size** settings and the first decision relates to proper zone connection and discerning the large zones wired into this zone controller. In this case the term "large zone" means the capacity of the complete boiler system (multi-boilers) is required to satisfy the capacity of "large" zone(s). Set the large zone dial switch to position 3, but in this position it is assumed more than the **master** boiler is required and all element stages will be activated, based upon boiler outlet temperature sensing. For zone 1 the dial setting needs to be related to the zone Btu capacity which is communicated and related back to element stage zoning for the first or master boiler.

"F" – one large zone which needs to be tied into #7. Zones 1-6 and 8 require setting the dial switch representing the Btu's for this zone and can be related to the Btu numbers in the above chart.

"G" – two large zones which need to be tied into #6 and #7. Zones 1-5 and 8 require setting the dial switch representing the Btu's for each zone and can be related to the Btu numbers in the above chart.

"H" – three large zones which need to be tied into #5, #6, and #7. Zone 1-4 and 8 require setting the dial switch representing the Btu's for each zone and can be related to the Btu numbers in the above chart.

Unique Zone Controller Dual Temperature Feature

The switchable priority has the normal function of allowing zone 1 to override or hold off all other zones so the boiler can produce full capacity energy for zone 1 requirement. **In addition**, this zone controller with the TS boiler also automatically raises the outlet temperature for low mass, high supply temperature zone.

- Example – zone #1 – baseboard fin tube, air handler coil, staple-up, etc. With priority switch on and as factory shipped, zone 1 is always high temperature (150°) requirement. The remaining zones, typically connected to radiant floor tubing, operate at the outlet temperature setup by the front panel red knob. On the inside boiler control board there is a plug-in header which can be field changed to increase supply temperature to 180°.
- Change the 150° operating point to 180° – remove the peg jumper header marked "J7". There may be applications where priority is desired but not dual temperature. In this case there is a peg jumper on the zone control board.
- Priority without high temperature shift – remove the peg jumper header next to "Dual Temp"

Priority High Temperature Zone Function

Application – one zone requires higher supply temperature (typically low mass) and the remaining zones require low temperature (typically high mass).

Note: When zone 1 is activated with the priority switch on, the zone size dial setting for zone 1 is bypassed. In this arrangement, the zone control board allows the master boiler to regulate the staging and temperature requirements needed for zone 1. In other words, it is possible the full capacity of the boiler or boilers will be on during the priority call.

1. The stat relating to priority **must be stat 1 (W input)**.
2. The zone valve or pump relating to priority must be zone 1.
3. Priority switch must be in "ON" position.
4. With priority on and stat 1 "W" terminal at 24 volts, zone output terminals 2-8 are interrupted (zone valve motor or zone pump does not activate).
5. The LED associated with the stat inputs is active and shows the stat status.
6. LED 9 will pulse rapidly to indicate system is in active priority mode.

7. With stat 1 input and priority switch on, the boiler outlet temperature will regulate at one of two preset values: 150° F or 180° F. At the boiler main control board (hinged door) approximate center left side is a 2-pin jumper associated with the markings **J7**.
    a. 150° F – as factory shipped, the 2-pin header is installed as a jumper.
    b. 180° F – remove the 2-pin shorting block header.
    c. **Note**: If your installation does not require high temperature during priority, remove the 2-pin shorting block header labeled "Dual Temp" located in the middle of the zone control board.
8. "Priority AUX" is a dry contact terminal block, which is a direct function of zone 1 end switch terminal (3 to 4).
9. After a 90-minute timeout, zones 2-8 are released to respond to stat inputs. Zone 1 could remain active, but any other zones that are calling will respond as if the system is not in priority. Zone 1 also returns to a normal stat input. The supply temperature drops to front panel setting. An interruption of zone 1 "W" terminal or turning priority switch off/on resets this 90-minute timer. **Note:** All elements (stage LED's) may be off until supply temperature drops to front panel red knob set point.

If a longer timeout is desired – some applications may require a greater priority timeout than the standard 90 minutes. Located in the center of the zone controller is a small jumper labeled "PRIORITY TIME". Simply removing jumper will activate a 4-hour priority timeout.

Priority Garage Zone Function

Application – garage zone requires isolation from other zones as not to mix the water in the garage zone with water heating the living space. In essence, the garage water would be "sucking" heat energy from the living space zones when they are activated together.

Note: When zone 8 is activated with the GARAGE priority jumper removed, the zone size dial setting for zone 8 is not observed. In this arrangement, the zone control board allows the master boiler board to regulate the staging and temperature requirements needed for zone 8 only. In other words, it is possible that the full capacity of the boiler or boilers will be on during the priority call.

1. The stat relating to priority **must be stat 8 (W input)**.
2. The zone valve or pump relating to priority must be zone 8.
3. Garage priority jumper must be removed.
4. With garage priority jumper off and stat 8 "W" terminal at 24 volts, zone output relays 1-7 are interrupted (zone valve motor or zone pump does not activate).
5. The LED associated with the stat inputs is active and shows the stat status.
6. LED 9 will slowly pulse to indicate system is in active garage priority mode.
7. With stat 8 input and garage priority jumper off, the boiler outlet temperature will regulate at boiler front dial setting.
8. After a 90-minute timeout, zones 1-7 are released to respond to stat inputs. Zone 8 could remain active, but any other zones that are calling will respond as if the system is not in garage priority.

If a longer timeout is desired – some applications may require a greater priority timeout than the standard 90 minutes. Located in the center of the zone controller is a small jumper labeled "PRIORITY TIME". Simply removing jumper will activate a 4-hour priority timeout.

Staging

The actual boiler stages are controlled within the boiler main board from the information calculated within the zone controller board and communicated to the boiler main board. The sum of the various zone input dial switches determines which boiler stages are active. The zone dial switches calculation has priority over the temperature sensing. However, if the temperature sensing indicates the vessel is suddenly rising, it will override and turn off stages.

The number of stages will depend upon capacity calculations from the settings. The capacity dial switch position has an assigned value:

15,000 Btu/h = 0
30,000 Btu/h = 1
45,000 Btu/h = 2
60,000 Btu/h = 3

As the zone stats turn on and off these are added for a boiler staging sum. This sum value controls stage per:

1 = Stage 1
2 = Stage 2
3 = Stage 3
4 = Stage 4

There is an approximate 6 to 60-second delay between stage-up turn on and less than 4-second delay on stage-down.

> **Note:** See previous section on sizes as they relate to EB-C-** commercial and special paragraph for multi-boilers.

Operational Indicators

Monitor LED's

- Power on – green LED represents good fuse and 24-volt transformer source.
- Slab stat or temperature sensing thermostat inputs – illuminates with voltage at "W".
- Zone output bulbs (not included with the EB-Z*S8) – illuminates with appropriate stat heat call.
- LED 9 – Diagnostic LED
  - Off = No demand from zones 1 – 8
  - ON = Demand from zone(s) 1 – 8 exists
  - Fast Pulse = Dual temperature priority call exists (zone 1)
  - Slow Pulse = Garage priority call exists (zone 8)

Power On, Start Up

Operational Test

1. Thermostat and zone reaction – as each thermostat is turned up there should be an appropriate reaction from the zone pump connected to the correct zone output number and zone thermostat. LED's for stat input, mode of operation (see diagnostic LED) and bulb lights for zone outputs should follow their appropriate inputs.
2. Boiler, call for heat LED – with a single zone turn-on, the boiler should be activated and show a heat call.
    a. If not, check the "C" or common between this zone board and the boiler or the "W-OUT" wire going to the boiler W.
3. Digital communication to the main boiler board – there are two suggested checkout methods. The A method can only apply if the program control chip within the main boiler is 5.33 (or higher) or 6.22 (or higher).

A – After each power-up the internal system verifies proper data communication between the zone controller and the boiler main board. This can be verified by observing the EL ON (yellow) front panel LED.

1. Turn off the boiler CB1 (basically removing power from the internal 24-volt transformer).
2. Watching the front panel EL ON (yellow) LED, turn on the circuit breaker.
3. Approximately 5 to 8 seconds later this EL ON LED blinks for approximately 15 seconds.
4. This is a verification of proper hookup and functioning of both main board and zone controller board.
5. If the blink function was not correct as detailed above, recheck the wiring between the two REMOTE terminal blocks, 24-volt power at the Zone Controller board, 7 proper 24-volt wiring polarity with C going to C, etc.

B – Activate several zone thermostats and wait for all 4 stage lights (main circuit board, inside) to come on within the main boiler. Turn off or decrease setting of all zone thermostats **except** the one smallest zone. Within 15 seconds, the stage lights on the main boiler board shall drop out, showing only the number of stages relating to the value dial switch setup for the smallest zone (example – dial switch set on 0 or 15,000 BTU equals stage 1 only). 4. Priority (if using and on) – do not activate stage 1, activate one or two other stages and observe proper action within the zone device (not LED, the zone device itself). Now activate zone 1 verify the other zone devices drop out. The main boiler will also stage up for full output.

Troubleshooting Helps

Troubleshooting

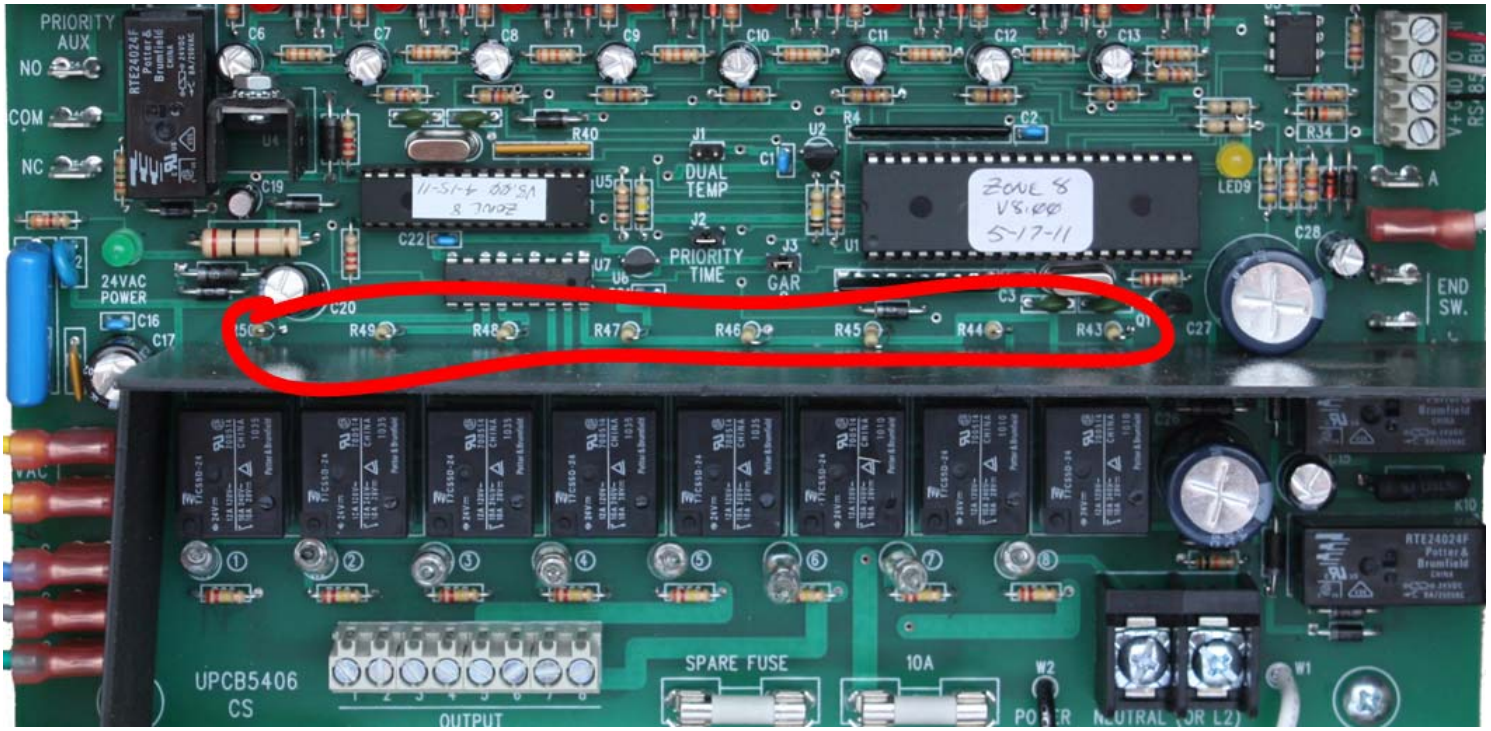
1. The LED's on this zone control board should provide adequate indication of inputs and outputs.
2. See previous description on priority and dual temp arrangement.
3. If troubleshooting the complete boiler system indicates the desire to unplug the remote bus connector to verify whether or not the zone controller is interacting with the main boiler board, the main boiler must be reset (power off and on) whenever the remote bus cable is unplugged or plugged back in.

Zone Output Troubleshooting

In the design of this zone controller, measures were made to allow for the testing of each individual zone output terminal to be done regardless of room thermostat status. Located roughly in the middle of this control board are a row of resistors (R50-R43). By shorting the exposed lead of any of these resistors to common, you can individually test each zone output.to ensure zone valve, actuator or pump is in good working condition.

Procedure:

Shorting R50 to C = Zone output 1 is energized
Shorting R49 to C = Zone output 2 is energized
Shorting R48 to C = Zone output 3 is energized
Shorting R47 to C = Zone output 4 is energized
Shorting R46 to C = Zone output 5 is energized
Shorting R45 to C = Zone output 6 is energized
Shorting R44 to C = Zone output 7 is energized
Shorting R43 to C = Zone output 8 is energized



Zone Board Functions, 5406

Stat W inputs – external contact between R and W 1 through 8 terminal block.

R to W1 can be priority, if priority switch is on. With priority switch on and W1-in:

- K11 form C priority AUX relay contacts
- Output zone 1 active
- Priority time begins (select 90 minutes or 4 hours)
- Zones 2 through 8 are locked off
- High temp is communicated to RS485 bus (Boiler control)
- When timeout priority is basically ended, until a new W-in, all zones return to normal
- Terminal block C – this is a convenience common block if there are 3-wire stats requiring a common.

Garage or cold zone disable – with GAR jumper pulled and R to W8-in, OUTPUT zones 1 through 7 are inactive. Timer begins, same as priority time.

- If W8-in continues through timer, function is over and each zone output will again follow each W*-in.

W-OUT tab provides R voltage to the energy generating product (Electro-Boiler, NorAire, Buffer Tank Controller, etc.). Two internal relays activate this W-OUT.

- K9 – any single W1 through W8 closes this contact for W-OUT output
- K10 NC – controls the W-OUT source.

RS485 bus controlled disable:

- K10 is software drive and is typically used as a zone system disable.
- Second K10 contact NC – also interrupts the source for the 8 output relays
- Stat LED's still show heat call

END SW contact – K9 also provides an isolated closure from any W1 through W8-in.

- The end SW contact is a hardware function tied directly to the stat W*-in.
- Typically this should not be used to control the main load header pump, unless this pump is variable speed with its own control to off.

Zone valves with main load header pump – a 24-volt coil power relay can be tied to W-OUT. Using the W-OUT tab will interrupt the pump when there is a software disable command.

Visual indicators:

- There is a red LED tied to each W*-in
- There is a neon tied to each zone relay OUTPUT. These neon glow indicators react to line voltage only, 120 or 240. If the zone board is converted or operating at 24 volts for zone valves or manifold actuators, these output neon lights will not illuminate.
- Power LED, green – directly tied to R source.
- Status LED, yellow – software driven, full on with a W*-in, pulsing when priority timer is active, or slow pulse when OUTPUT is disabled – "flash pulse" during priority gas call.

Fuse protection:

- Control board and stat R – 3-amp, slow reacting, onboard automatic reset. Intended primarily to protect external short from any R TB or tab. Power must be removed for 5 minutes to allow cool off reset.
- Zone OUTPUT relay contact block – 10A fast blow in series with output relay contacts and black hookup wire. Factory supplies a spare fuse clipped on board.

Zone OUTPUT terminal block source – can be configured for three zone device outputs. The pigtail black and white wires determine the OUTPUT voltage.

- 120-volt AC zone pumps – source 120V terminal block for directly powering 120-volt AC zone pumps
- 240-volt AC zone pumps – connect black and white wires to a 240 L1 and L2
- 24-volt AC zone valves or manifold actuators – the pigtail yellow and gray wires can be externally tied to a field supplied 24V transformer. It is the installer's responsibility to calculate transformer size for the maximum connected OUTPUT terminal block loads/motors.
- Neutral for output zone devices – the white wire connected to the large neutral block and the neon indicator lights.

A-tab – this is a software controlled input, with the standard software a 24V signal at the A-tab is a K10 disable.

Buffer Tank Controller, Included Zone Board – @EBZBT5406

Same as above.

Zone controller – @EBZ8U5406 – additions:

- Each stat W*-in has a 4 position dial switch for field setting the assigned Btu/h value to each appropriate zone. The dial switch has position digits, these need to be interpreted as Btu/h zone size.

  0 = 15,000
  1 = 30,000
  2 = 45,000
  3 = 60,000

Size dial switch – depending upon the Electro-Boiler size and element stage configuration there is an 8 position dial switch which needs to be set to match the Electro-Boiler model. The Zone Controller installation manual (BI013) will provide this A through H required setting position.

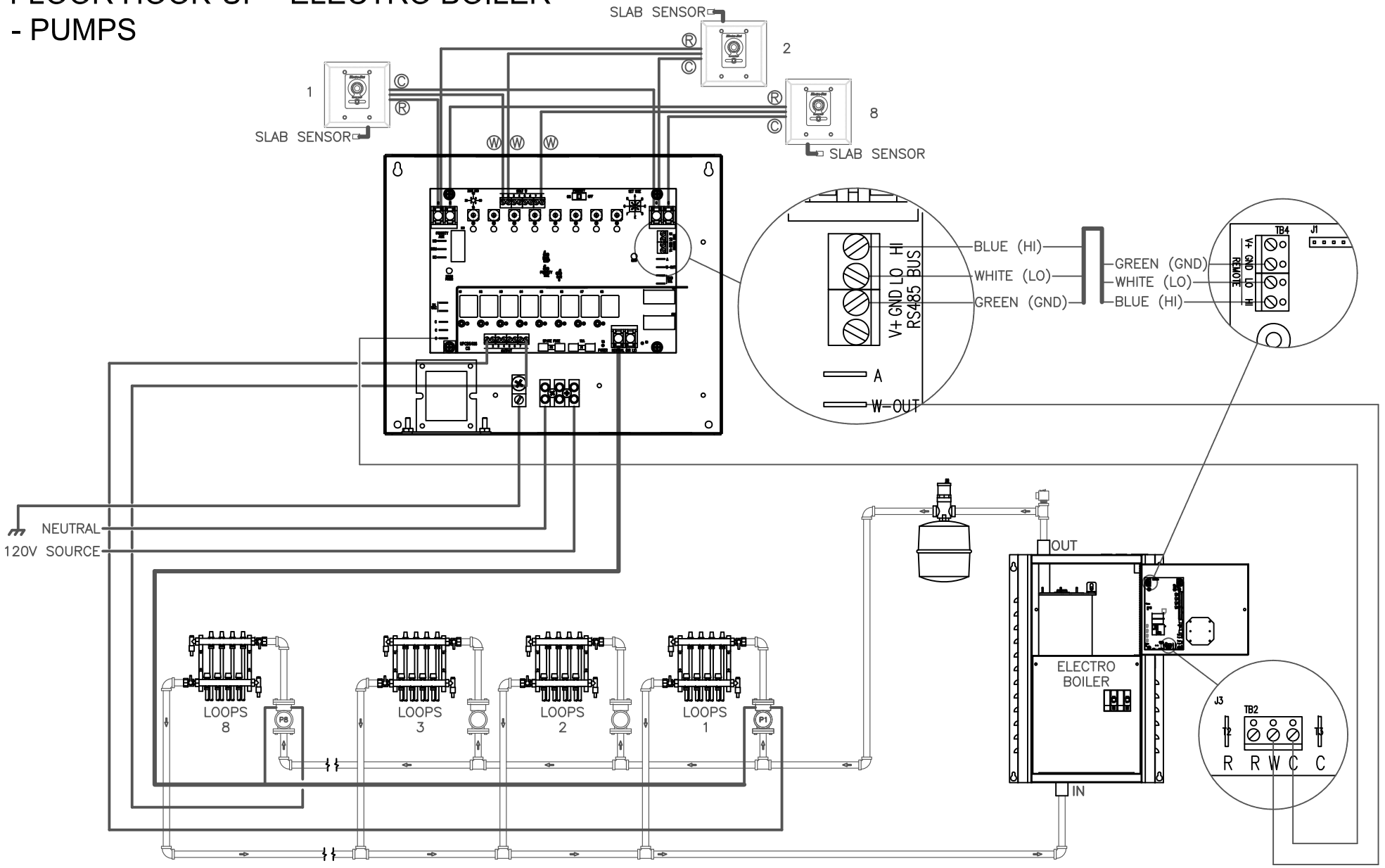
- Stat W4 special – depending upon the Electro-Boiler size and associated size dial position, this zone Btu dial switch may be assigned a 2X Btu value.

EB-C series Electro-Boiler size positions may also have other Btu/h multipliers.

Accessories/Options

ES-24-BR – Electro Industries slab sensing thermostats.

EB-Z*A8 RADIANT
FLOOR HOOK-UP - ELECTRO BOILER - PUMPS



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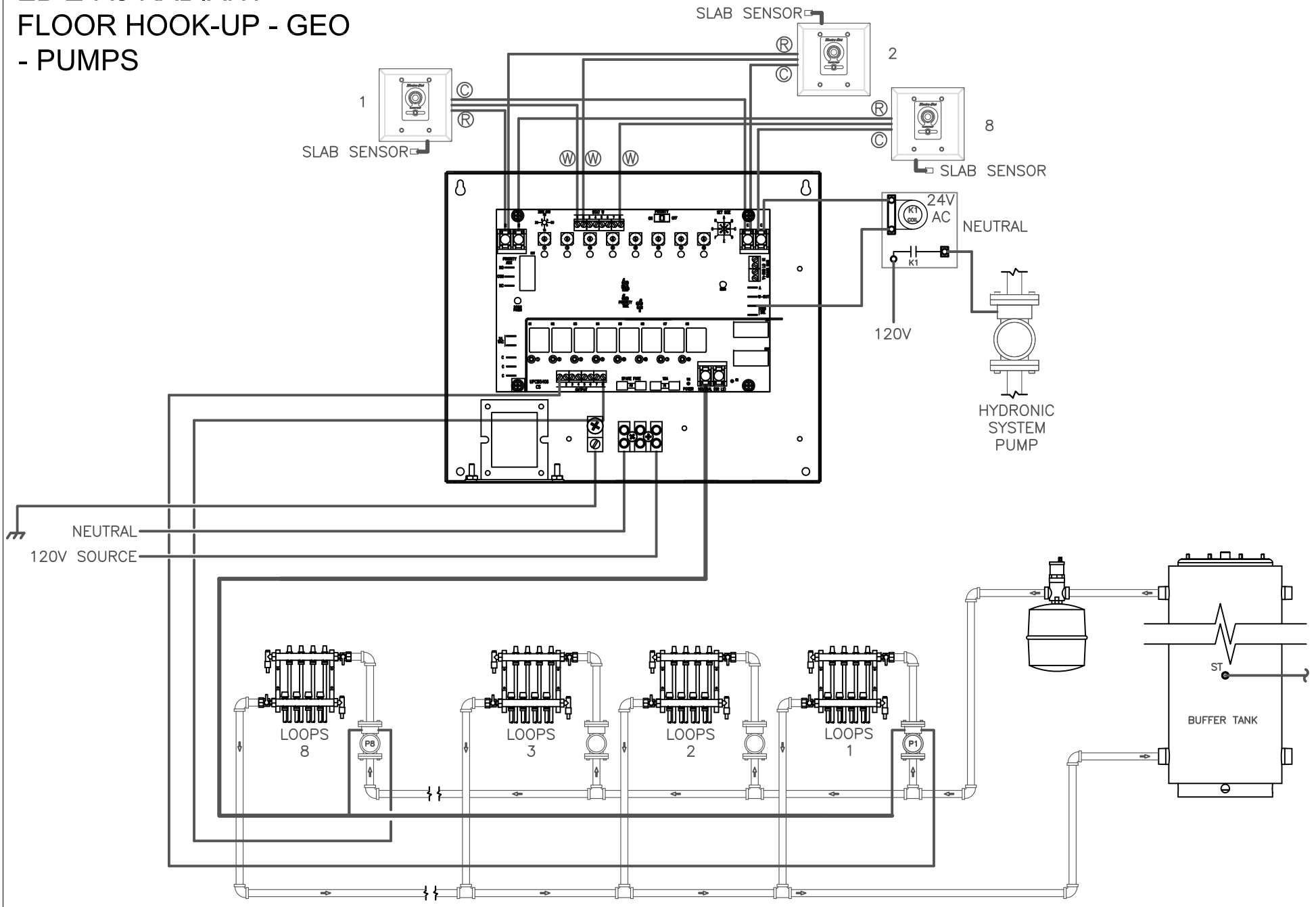
EB-Z*A8 RADIANT FLOOR HOOK-UP - GEO - PUMPS



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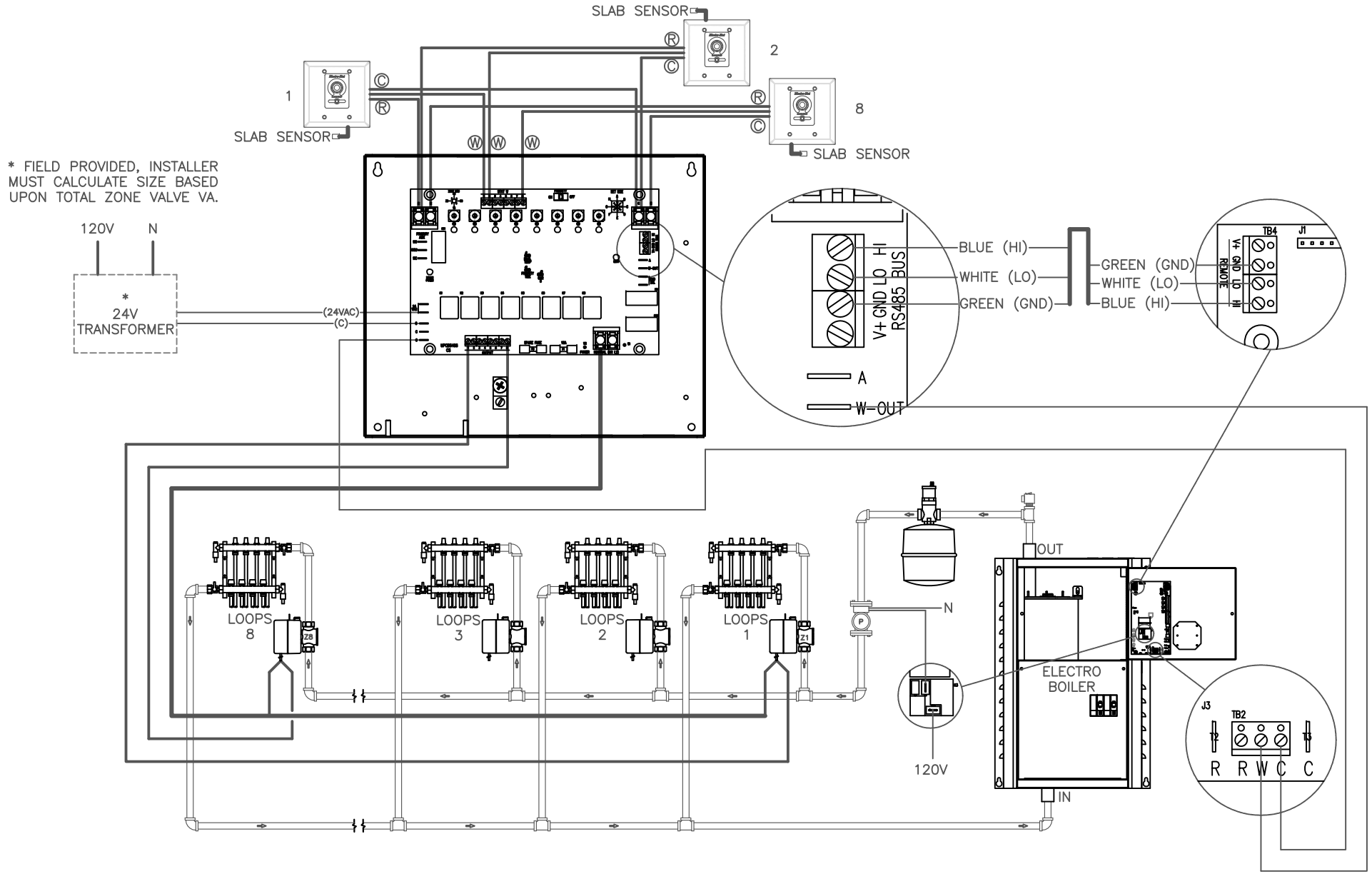
BH031 P2
Rev. C 5-8-2012

EB-Z*S8
RADIANT FLOOR HOOK-UP-ELECTRO BOILER
- ZONE VALVES OR ACUATORS



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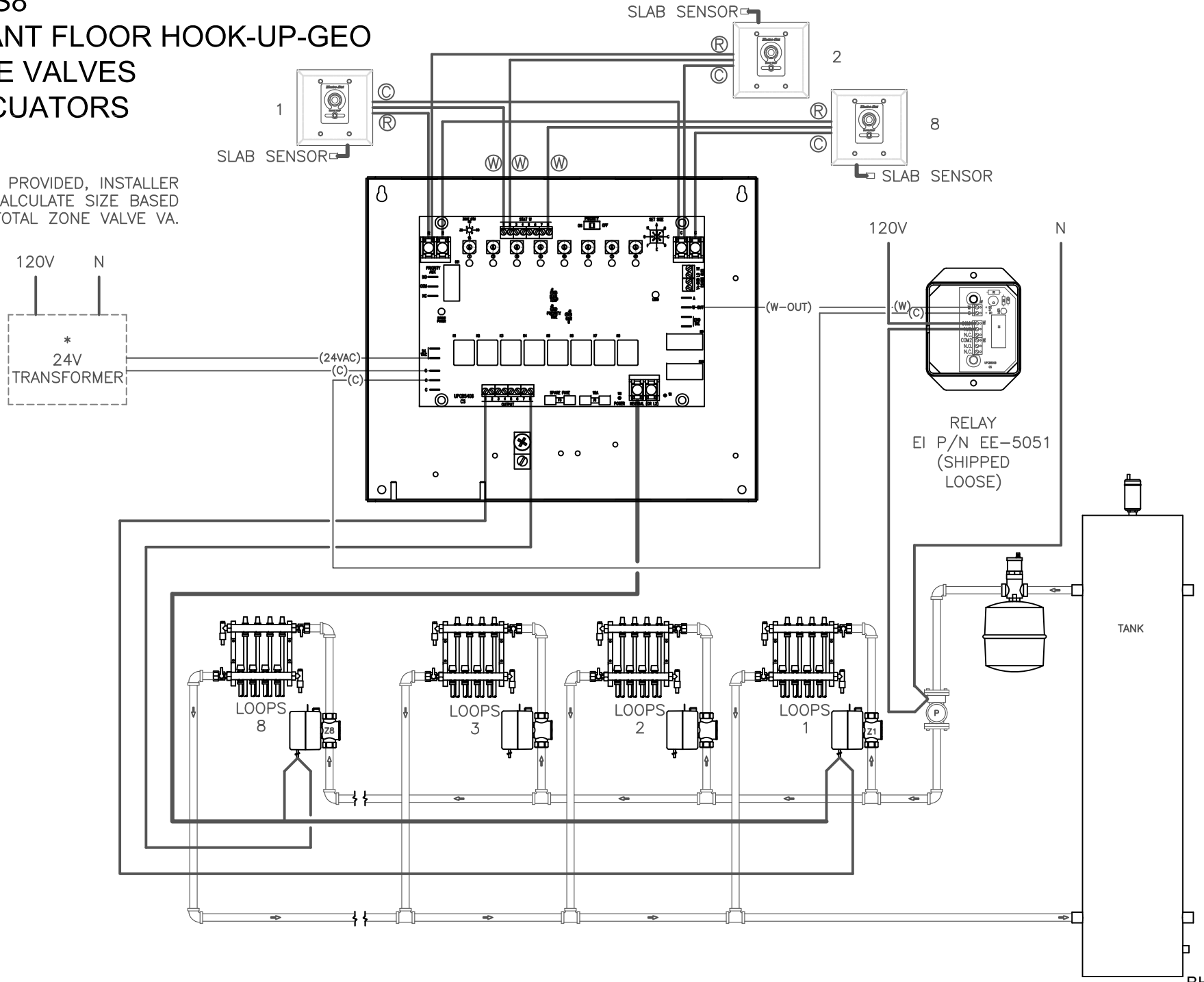
Rev.C 5-8-2012

EB-Z*S8
RADIANT FLOOR HOOK-UP-GEO - ZONE VALVES OR ACUATORS



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Rev.C 5-8-2012

Electro Industries, Inc. Residential Limited Product Warranty

Effective November 1, 2009

Electro Industries, Inc. warrants to the original owner, at the original installation site, for a period of two (2) years from date of original purchase, that the product and product parts manufactured by Electro Industries, Inc. are free from manufacturing defects in materials and workmanship, when used under normal conditions and when such product has not been modified or changed in any manner after leaving the plant of Electro Industries, Inc. If any product or product parts manufactured by Electro Industries, Inc. are found to have manufacturing defects in materials or workmanship, such will be repaired or replaced by Electro Industries, Inc. Electro Industries, Inc., shall have the opportunity to directly, or through its authorized representative, examine and inspect the alleged defective product or product parts. Electro Industries, Inc. may request that the materials be returned to Electro Industries, Inc. at owner's expense for factory inspection. The determination as to whether product or product parts shall be repaired, or in the alternative, replaced, shall be made by Electro Industries, Inc. or its authorized representative.

Electro Industries, Inc. will cover labor costs according to the Repair / Replacement Labor Allowance Schedule for a period of ninety (90) days from the date of original purchase, to the original owner, at the original installation site. The Repair / Replacement Labor Allowance is designed to reduce the cost of repairs. This Repair / Replacement Labor Allowance may not cover the entire labor fee charged by your dealer / contractor.

TWENTY YEAR (20) LIMITED WARRANTY ON BOILER ELEMENTS AND VESSELS

Electro Industries, Inc. warrants that the boiler elements and vessels of its products are free from defects in materials and workmanship through the twentieth year following date of original purchase. If any boiler elements or vessels are found to have a manufacturing defect in materials or workmanship, Electro Industries, Inc. will replace them.

TWENTY YEAR (20) LIMITED WARRANTY ON SPIN FIN ELEMENTS

Electro Industries, Inc. warrants that the spin fin elements of its products are free from defects in materials and workmanship through the twentieth year following date of original purchase. If any spin fin elements are found to have a manufacturing defect in materials or workmanship, Electro Industries, Inc. will replace them.

FIVE YEAR (5) LIMITED WARRANTY ON OPEN WIRE ELEMENTS

Electro Industries, Inc. warrants that the open wire elements of its products are free from defects in materials and workmanship through the fifth year following date of original purchase. If any open wire elements are found to have a manufacturing defect in materials or workmanship, Electro Industries, Inc. will replace them.

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Monticello, Minnesota
800.922.4138
www.electromn.com

CONDITIONS AND LIMITATIONS:

1. This warranty is limited to residential, single family dwelling installations only. Any commercial or multi-unit dwelling installations fall under the Electro Industries Commercial Limited Product Warranty.
2. Electro Industries, Inc. shall not be liable for performance related issues resulting from improper installation, improper sizing, improper duct or distribution system, or any other installation deficiencies.
3. If at the time of a request for service the original owner cannot provide an original sales receipt or a warranty card registration then the warranty period for the product will have deemed to begin the date the product is shipped from the factory and **NOT** the date of original purchase.
4. The product must have been sold and installed by a licensed electrician, plumbing, or heating contractor.
5. The application and installation of the product must be in compliance with Electro Industries, Inc. specifications, as stated in the installation and instruction manual, and all state, provincial and federal codes and statutes. If not, the warranty will be null and void.
6. The purchaser shall have maintained the product in accordance with the manual that accompanies the unit. Annually, a qualified and licensed contractor must inspect the product to assure it is in proper working condition.
7. All related heating components must be maintained in good operating condition.
8. All lines must be checked to confirm that all condensation drains properly from the unit.
9. Replacement of a product or product part under this limited warranty does not extend the warranty term or period.
10. Replacement product parts are warranted to be free from defects in material and workmanship for ninety (90) days from the date of installation. All exclusions, conditions, and limitations expressed in this warranty apply.
11. Before warranty claims will be honored, Electro Industries, Inc. shall have the opportunity to directly, or through its authorized representative, examine and inspect the alleged defective product or product parts. Remedies under this warranty are limited to repairing or replacing alleged defective product or product parts. The decision whether to repair or, in the alternative, replace products or product parts shall be made by Electro Industries, Inc. or its authorized representative.

THIS WARRANTY DOES NOT COVER:

1. Costs for labor for diagnosis, removal or reinstallation of an alleged defective product or product part, transportation to Electro Industries, Inc., and any other materials necessary to perform the exchange, except as stated in this warranty. Replacement material will be invoiced to the distributor in the usual manner and will be subject to adjustment upon verification of defect.
2. Any product or product part that has been damaged as a result of being improperly serviced or operated, including, but not limited to, the following: operated during construction phase, with insufficient water or air flow; allowed to freeze; subjected to flood conditions; subjected to improper voltages or power supplies; operated with air flow or water conditions and/or fuels or additives which cause unusual deposits or corrosion in or on the product; chemical or galvanic erosion; improper maintenance or subject to any other abuse or negligence.
3. Any product or product part that has been damaged as a result of natural disasters, including, but not limited to, lightning, fire, earthquake, hurricanes, tornadoes or floods.
4. Any product or product part that has been damaged as a result of shipment or handling by the freight carrier. It is the receiver's responsibility to claim and process freight damage with the carrier.
5. Any product or product part that has been defaced, abused or suffered unusual wear and tear as determined by Electro Industries, Inc. or its authorized representative.
6. Workmanship of any installer of the product or product part. This warranty does not assume any liability of any nature for unsatisfactory performance caused by improper installation.
7. Transportation charges for any replacement product, product part or component, service calls, normal maintenance; replacement of fuses, filters, refrigerant, etc.

THESE WARRANTIES DO NOT EXTEND TO ANYONE EXCEPT THE ORIGINAL PURCHASER AT RETAIL AND ONLY WHEN THE PRODUCT IS IN THE ORIGINAL INSTALLATION SITE. THE REMEDIES SET FORTH HEREIN ARE EXCLUSIVE.

ALL IMPLIED WARRANTIES, INCLUDING WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, ARE HEREBY DISCLAIMED WITH RESPECT TO ALL PURCHASERS OR OWNERS. ELECTRO INDUSTRIES, INC. IS NOT BOUND BY PROMISES MADE BY OTHERS BEYOND THE TERMS OF THESE WARRANTIES. FAILURE TO RETURN THE WARRANTY CARD SHALL HAVE NO EFFECT ON THE DISCLAIMER OF THESE IMPLIED WARRANTIES.

ALL EXPRESS WARRANTIES SHALL BE LIMITED TO THE DURATION OF THIS EXPRESS LIMITED WARRANTIES SET FORTH HEREIN AND EXCLUDE ANY LIABILITY FOR CONSEQUENTIAL OR INCIDENTAL DAMAGES RESULTING FROM THE BREACH THEREOF. SOME STATES OR PROVINCES DO NOT ALLOW THE EXCLUSION OR LIMITATION OF INCIDENTAL OR CONSEQUENTIAL DAMAGES, SO THE ABOVE LIMITATIONS OR EXCLUSIONS MAY NOT APPLY. PRODUCTS OR PARTS OF OTHER MANUFACTURERS ATTACHED ARE SPECIFICALLY EXCLUDED FROM THE WARRANTY.

THIS WARRANTY GIVES YOU SPECIFIC LEGAL RIGHTS, AND YOU MAY HAVE OTHER RIGHTS WHICH VARY UNDER THE LAWS OF EACH STATE. IF ANY PROVISION OF THIS WARRANTY IS PROHIBITED OR INVALID UNDER APPLICABLE STATE OR PROVINCIAL LAW, THAT PROVISION SHALL BE INEFFECTIVE TO THE EXTENT OF THE PROHIBITION OR INVALIDITY WITHOUT INVALIDATING THE REMAINDER OF THE AFFECTED PROVISION OR THE OTHER PROVISIONS OF THIS WARRANTY.