

# Z-one™ Relay Multi-Zone Valve Control

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## ZVR10X series



### Function

The ZVR series is a multi-zone zone valve and boiler operating control for multiple zone hydronic heating or cooling systems. The ZVR series interfaces with low voltage thermostats, or any other low voltage controllers having a switching action. The ZVR series controls up to 3, 4, 5 or 6 zones, depending on model selected. In addition, a system circulator pump and secondary pump is turned on whenever any zone calls for heat. LED indicators provide functional status and easy system troubleshooting. The ZVR series is a perfect match with Caleffi's Z-one™ motorized zone valves.

- Compatible with low voltage 2, 3, or 4 wire thermostats
- R, W, C and TT Comm dual labeling at thermostat terminals
- Z-oneLink unlimited zone expansion
- Selectable priority with 1 hour time-out feature
- System pump status selectable during priority
- Circulator will start only after the zone valve end switch is closed
- Dry contacts for DHW (ZR/ZC), capable of switching line voltage
- Large terminal connections
- High Capacity 40 VA Transformer standard for 3 and 4 zone models-expandable to 80 VA, and 80 VA for the 6 zone model
- Automatic resettable fuse
- Controls system pump, secondary pump, and priority pump
- Front LED Lights
- 100% Factory tested with 3 year warranty
- ETL Approved

### Product Range

- Code ZVR103** Z-one™ Relay switching relays.....three zone
- Code ZVR104** Z-one™ Relay switching relays.....four zone
- Code ZVR106** Z-one™ Relay switching relays.....six zone

### Technical specifications

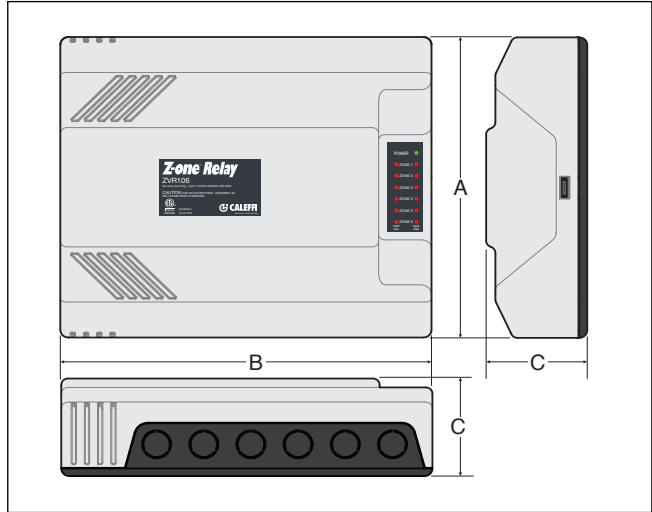
#### Materials

Housing plastic: ABS  
 Front display lights: LCD  
 Electrical Knockouts: (12) 1/2" size

#### Performance

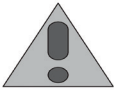
Power supply: 120 VAC, 50/60 Hz  
 Transformer voltage: 24 VAC  
 Maximum transformer load: 40 VA (ZVR103/4), 80 VA (ZVR106)  
 Electrical switch rating: 20A Max Combined  
 Electrical switch rating, ZR/ZC, DHW, XX: 120 VAC, 2A each  
 Electrical switch rating pumps: 120 VAC, 5A each  
 Resettable Fuse: automatic  
 Maximum temperature: 110°F (43°C)  
 Maximum humidity: 90% non-condensing  
 Approvals: Certified to CSA C22-2 No.24  
 Conforms to UL Standard 873

## Dimensions

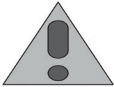


Code	Zones	A	B	C	Wgt. (lbs)
ZVR103	3	9 1/4"	11"	3"	3.2
ZVR104	4	9 1/4"	11"	3"	3.2
ZVR106	6	9 1/4"	11"	3"	3.2

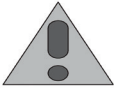
### SAFETY INSTRUCTION



This safety alert symbol will be used in this manual to draw attention to safety related instructions. When used, the safety alert symbol means **ATTENTION! BECOME ALERT! YOUR SAFETY IS INVOLVED! FAILURE TO FOLLOW THESE INSTRUCTIONS MAY RESULT IN A SAFETY HAZARD.**



**CAUTION:** All work must be performed by qualified personnel trained in the proper application, installation, and maintenance of systems in accordance with all applicable codes and ordinances.



**CAUTION:** Electrical shock hazard. Disconnect power before installation to prevent electrical shock or equipment damage. Make sure all connections are in accordance with the electrical wiring diagram and in accordance with national and local electrical codes.



**WARNING:** Avoid electrical noise interference. Do not install near large conductors, electrical machinery, or welding equipment. Avoid locations where excessive moisture, corrosive fumes, vibration, or explosive vapors are present.

Caleffi shall not be liable for damages resulting from misapplication or misuse of its products.

## Installation

### Inspection

Inspect packages for damage. If damaged, notify the appropriate carrier immediately. If undamaged, open the package and inspect the device for obvious damage. Return damaged products.

- Use only copper conductor supply wire suitable for at least 105° C
- All circuits must have a common disconnect and be connected to the same pole of the disconnect

### Maintenance and Repair

The Caleffi Z-one™ multi-zone valve control comes with a resettable fuse and requires no maintenance. If control fails or is damaged, replace control with functional one.

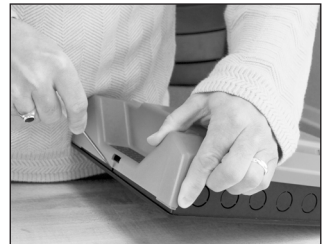
### Mounting

Mount the Caleffi Z-one™ switching relay box to a suitable surface. Slotted holes are provided for mounting purposes. Do not mount to a surface that exceeds 115°F (45°C). The unit must be only located in dry interior locations. It is not suitable for installation in hazardous locations and should not be placed close to any electromagnetic fields.

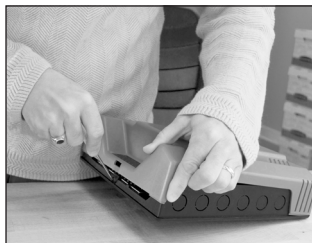
## Cover removal



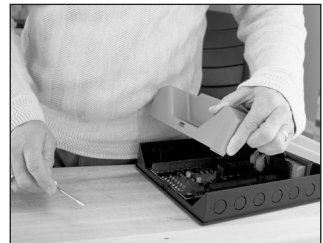
Hold either the left or the right end of the box up and at an angle. Use body for stabilizing relay box.



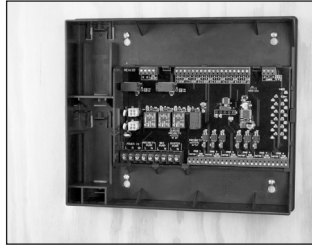
Insert screwdriver and push tab inward, cover should release from base.



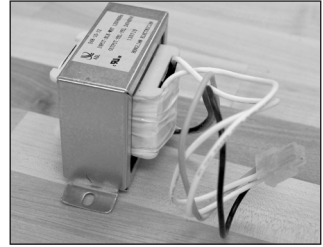
Roll cover off base.



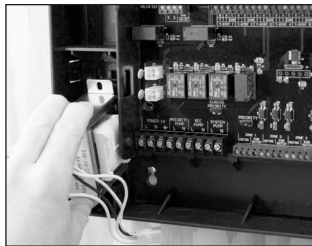
## Transformer Installation



Mount box on stable surface using level.



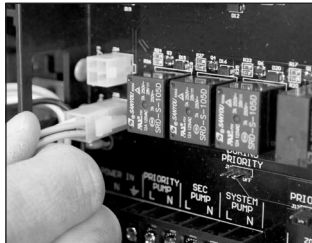
Remove transformer(s) from packaging.



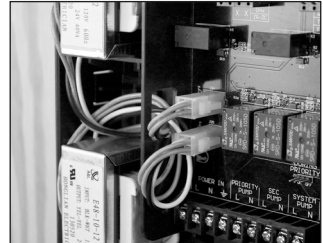
Slide bottom end of transformer into bottom latch.



Snap top of transformer into latch arms.



Feed wiring through hole near the top of the transformer and insert transformer plug into the socket.



Repeat process for 2nd transformer if six valve relay box.

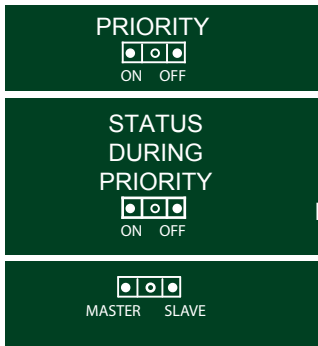
## Jumper set up

The jumpers on the ZVR series can be positioned for the following operations.

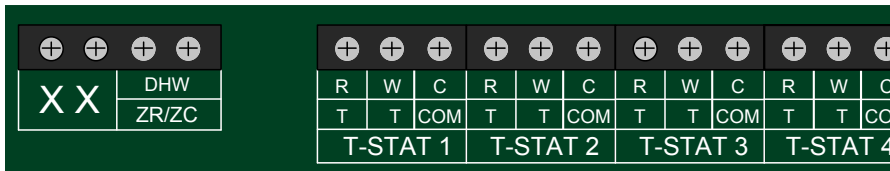
**Priority ON / Priority OFF:** When priority jumper is ON, upon demand, zone 1 will operate as priority and all other zones are temporarily switched off (with 1 hour time-out). When priority mode is OFF, any zones that were active when zone 1 was switched on will remain on.

**Status During Priority ON / Status During Priority OFF:** When status jumper is ON, the system pump will continue to operate during priority.

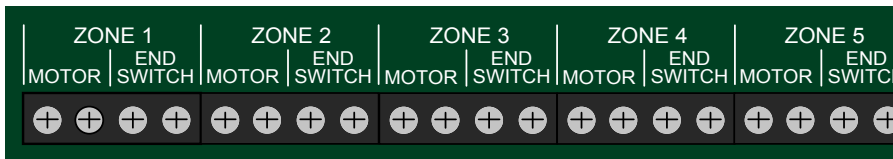
**Master / Slave:** allows for unlimited expansion to additional ZVR relays.



## Wiring terminals

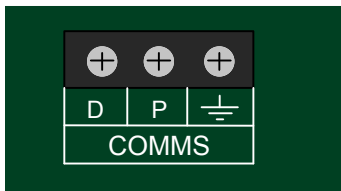


When a zone has a demand from a thermostat (T T or R W) the control will send 24 VAC to the corresponding zone valve. When the zone valve end switch closes, the primary pump will switch on and the (X X) dry contacts will close to signal the boiler of a heating demand. Zone 1 can be used for priority (either a priority pump or valve). When the priority jumper is ON, a demand from T-Stat1 will activate 24VAC to valve 1 and the priority pump will switch on after the end switch closes (requires a jumper in the end switch terminals if a valve is not used). The DHW (ZR/ZC) dry contact will also close. Depending upon "Status During Priority" jumper, the system pump will either be ON or OFF.



Large screw terminals connections makes wiring easy with three pump screw terminal connections. Pump terminals connection have 120 VAC outputs for simplified pump connections. Zone valve connections can be 2, 3 or 4 wire.

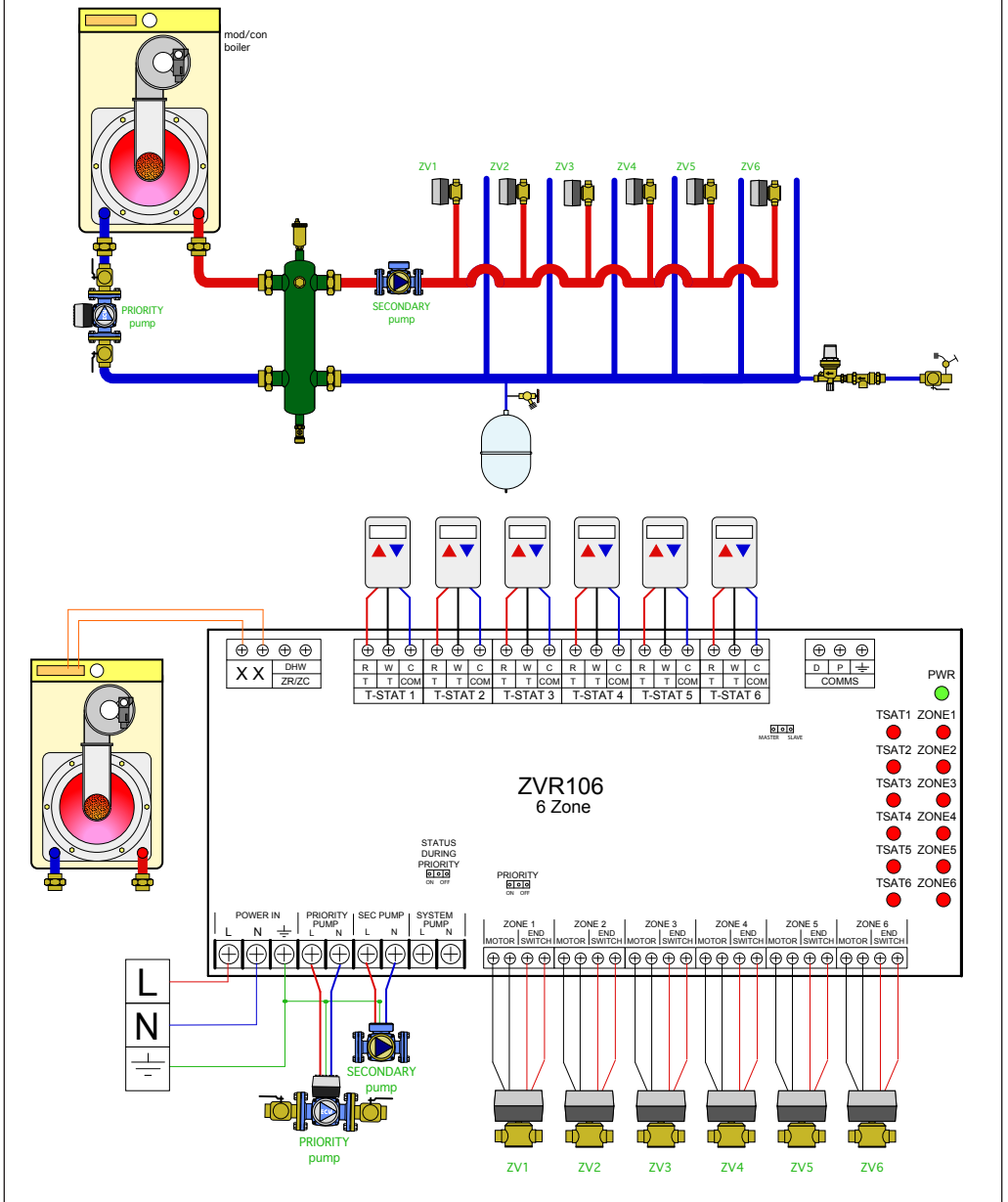
Z-oneLink unlimited expansion allows adding addition ZVR series relay controls to a Master ZVR. Communication is accomplished by connecting three wires (bell or thermostat wire) to the communication terminals located in the upper right hand corner. The jumper is positioned to Master / Slave position. A demand for heat from any zone will fire the boiler and start the pump.



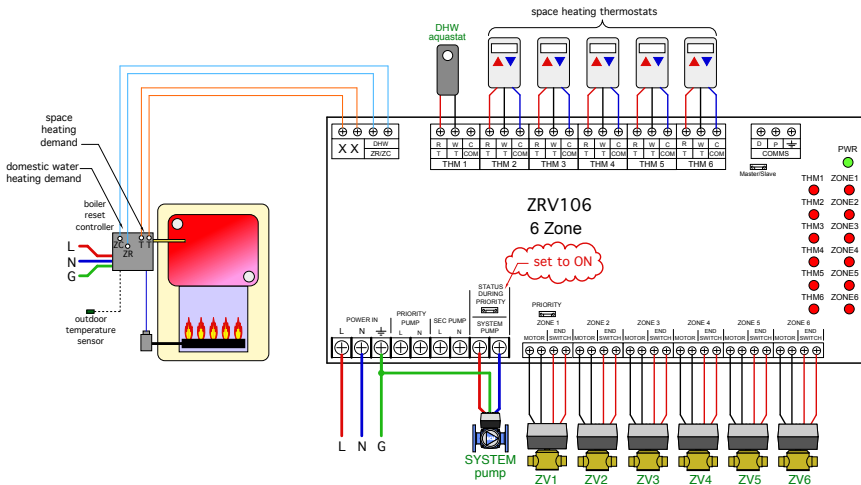
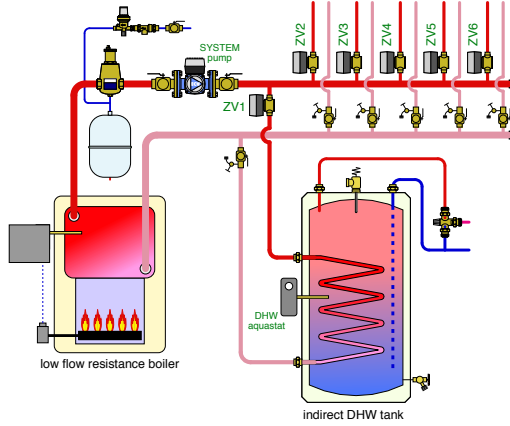
## Example Wiring Diagram

Please reference Z-one™ Relay wiring guide for complete listing of wiring diagrams.

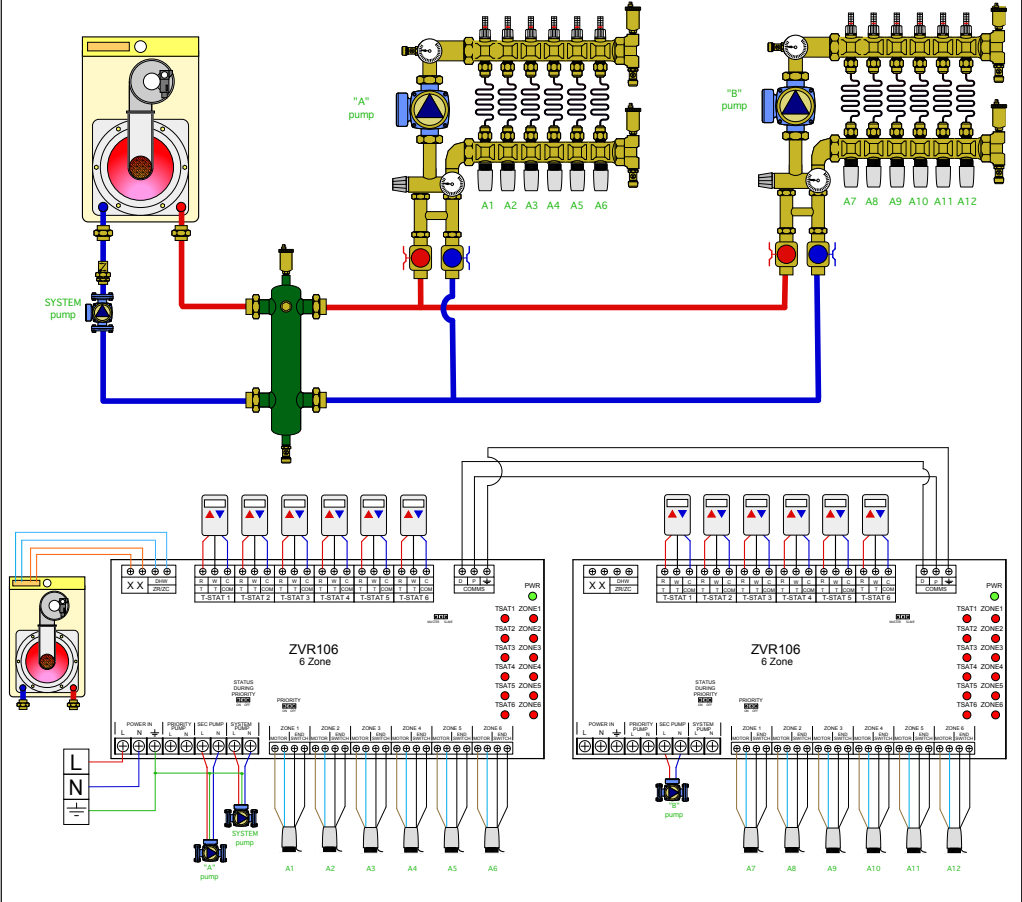
### ModCon boiler with Primary/Secondary



# Noncondensing boiler with outdoor reset and indirect DHW



**Modern boiler with Primary/Secondary and two secondary pumps**

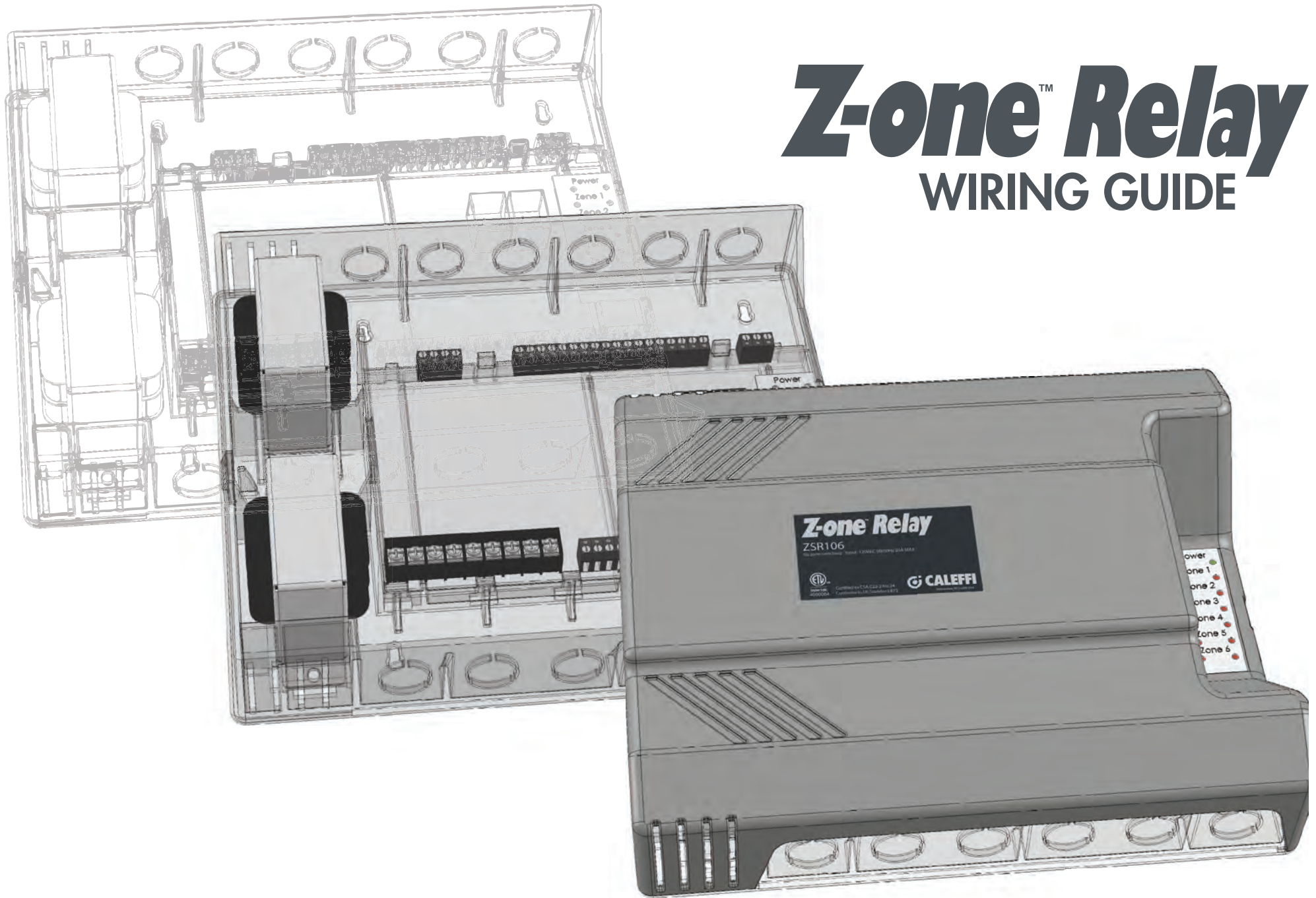


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# Z-one™ Relay

## WIRING GUIDE



# Z-one™ Relay

## WIRING GUIDE

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The ZSR101 is a versatile single relay control with two outputs for operating a 120 VAC pump with boiler enable, or two 120 VAC devices without boiler enable. Features include rear knock outs for 4x4 junction box mounting, convenient pre-installed jumper for pump operation, and 10 amp total load rating.

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The ZSR Series of controls is for zoning using pumps. Up to 6 zone pumps (model dependent) along with a primary pump can be operated. Zone priority is selectable with 1-hour time-out feature. Other features include pump exercising, selectable post purge, and 3 pump ground terminals for simplified wiring.

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The ZVR Series of controls is for zoning using zone valves. Up to 6 valves (model dependent), along with a system pump, secondary pump and zone 1 pump (typically used for DHW priority) can be operated. Zone priority is selectable with 1-hour time-out feature. System pump and secondary pump status (on/off) during priority is also selectable. Replaceable snap-fit 40 VA transformer standard for 3 & 4 zone models – expandable to 80 VA with 2nd transformer. 6 zone model has two 40 VA (80 VA) transformers.

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Certified to CSA C22-2 No.24  
Conforms to UL Standard 873

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## ZVR103, ZVR104 & ZVR106 - multi-zone valve control

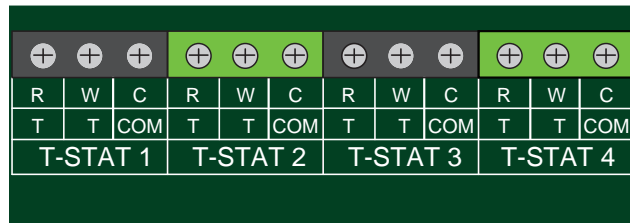
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## Z-one Thermostat Connections

All Caleffi Z-one controls use the same interface to connect to thermostats. This interface is very flexible and allows many different types of thermostats to be connected to the control including 2, 3 and 4 wire versions. In addition, any type of switching device can be used to signal a heat demand by connecting the R & W (T & T) terminals together. The terminals are dual labeled to help simplify wiring.

### Z-one T-stat interface



### Description

R = 24 VAC Supply

W = Heat Call

C = 24 VAC Common

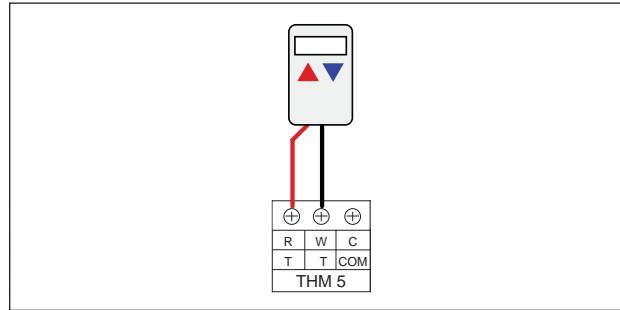
### Function

R&W: When connected, signals a heat demand.

R&C: Provides 24 VAC to powered thermostats.

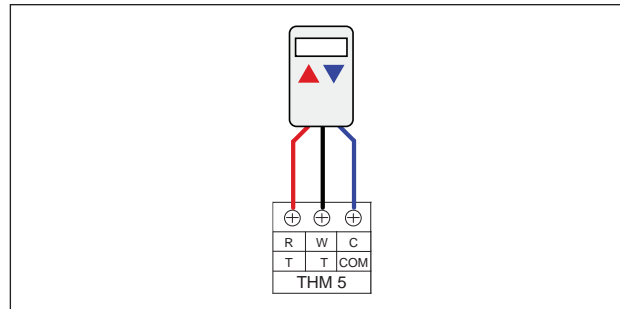
## 2-Wire Thermostats

There are a few different types of 2 wire thermostats including bi-metallic, power stealing and battery powered. All of these thermostats connect in the same manner to the Caleffi Z-one series of controls. Connect R to R and W to W. See below.



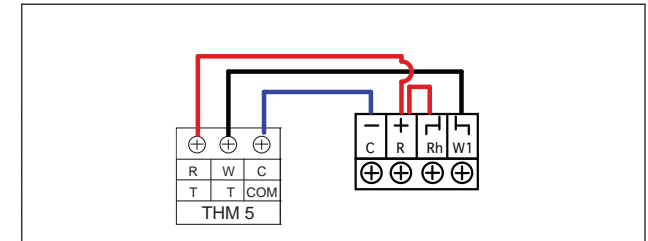
## 3-Wire Thermostats

Three wire thermostats get their power from the control they are connected to. R & C from the Z-one Control supply 24 VAC to the thermostat at all times while the W lead signals a heat demand.



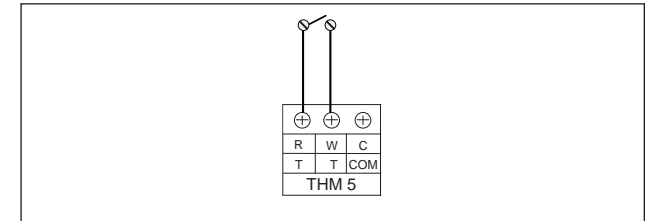
## 4-Wire Thermostats

To connect a 4-wire thermostat to the Z-one series controls, connect R to R, W to W and C to C. A jumper in the thermostat is also required between R & Rh as shown below. Similar to a 3-wire thermostat, R & C from the Z-one Control supply constant 24 VAC to the thermostat.



## Dry Contacts

A heat demand can also be initiated by any type of device that has dry contacts (dry contacts are a set of contacts that open and close but do not have any voltage present until supplied from an outside source). The end switch on a Z-one series zone valve is an example of a dry contact. Using a dry contact to connect R to W will initiate a heat demand.



**Always refer to the thermostat manufacturer's instructions.**



**WARNING:** NEVER CONNECT R & C DIRECTLY, this will be a direct short on the 24 VAC supply



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# Wiring zone valve to Caleffi ZVR control

## Wiring a standard zone valve to Caleffi Z-one Relay

Since a two wire actuator does not have an end switch for feedback to the ZVR control, the end switch terminals must have a jumper to simulate the end switch. If the end switch jumper is not installed, no demand will be sent to the boiler and the pumps will not turn on.

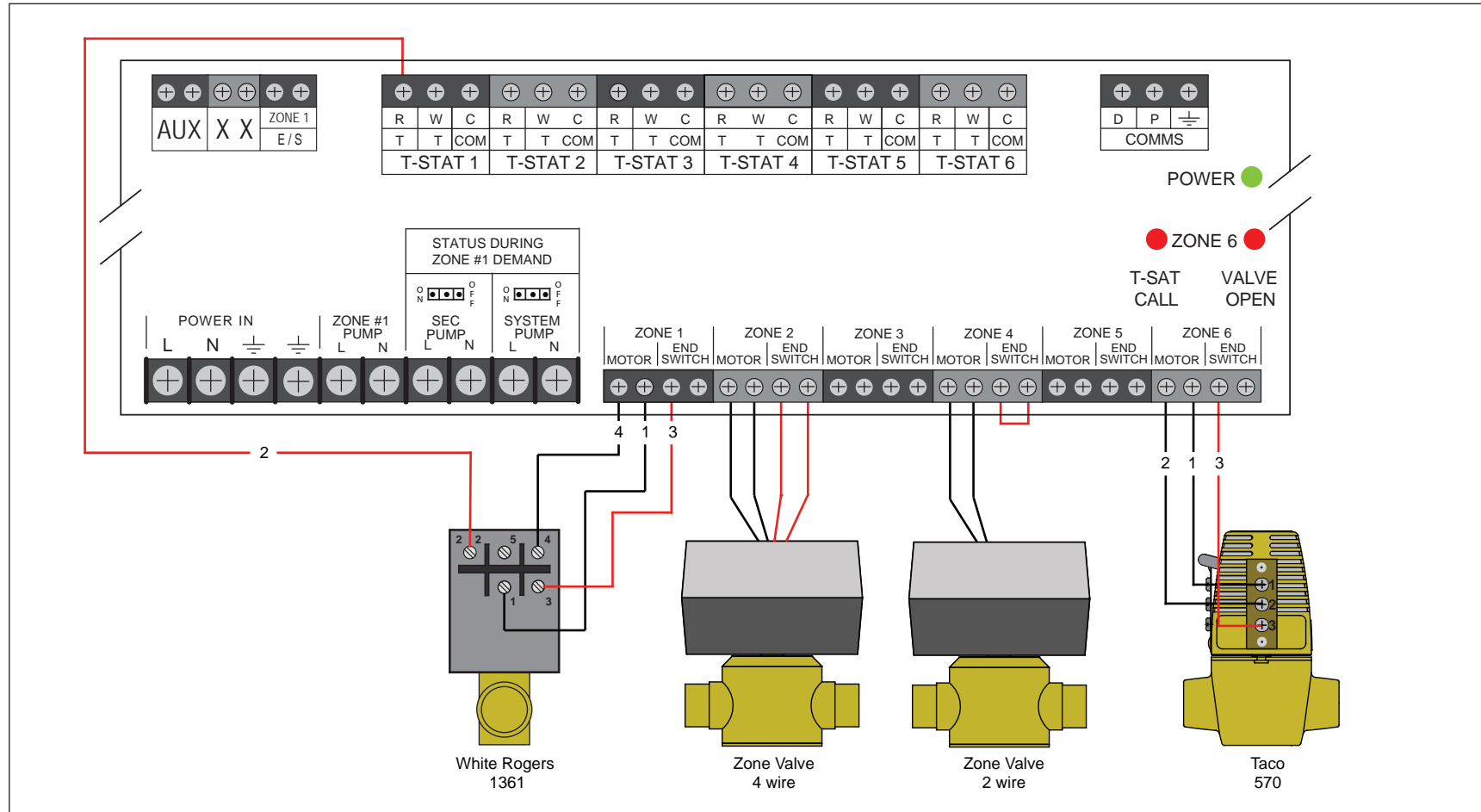
## Wiring a Taco 570 valve to Caleffi Z-one Relay

When connecting the Taco 570 zone valve to the Caleffi Z-one Relay, the wiring of this valve can only be done in one way. The left motor terminal on the ZVR series control must be connected to terminal 2 on the zone valve. The right motor terminal must be connected to terminal 1 on the zone valve. Lastly, the left end switch terminal

must be connected to terminal 3 on the zone valve. Failure to follow schematic will lead to damage of product.

## Wiring a White Rogers 1361 valve to Caleffi Z-one Relay

The White Rogers 1361 zone valve requires 24 VAC to terminal 2 at all times, therefore connect to the R terminal of the associated T-STAT on the ZVR control. The left motor terminal on the ZVR series control must be connected to terminal 4 on the zone valve. The right motor terminal must be connected to terminal 1 on the zone valve. Lastly, the left end switch terminal must be connected to terminal 3 on the zone valve. The 1361 can not be used on any zone when the ZVR control is set for priority.





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# Z-one™ Relay

## ZSR101 - Single Zone Switching Relay

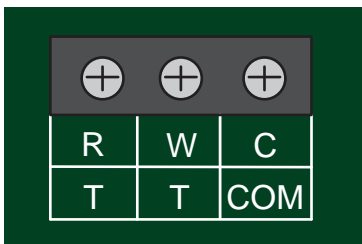
### Overview

- Compatible with 2, 3 and 4-wire thermostats or other low voltage controllers with switching action
- 120 VAC input
- Heavy duty, sealed, DPDT, fuse protected relay (with spare fuse)
- Two dry contact outputs (Relay 1 and Relay 2) for operating 120 VAC pump with boiler enable or two devices without boiler enable
- 5 A capacity each relay - 10 A total
- Rear knock-outs for mounting onto 4"x4" junction box
- High capacity 6VA transformer
- Simplified wiring with pre-installed jumper
- 100% factory tested with 3 year warranty
- ETL certified

See technical brochure 01284 NA for more product information.

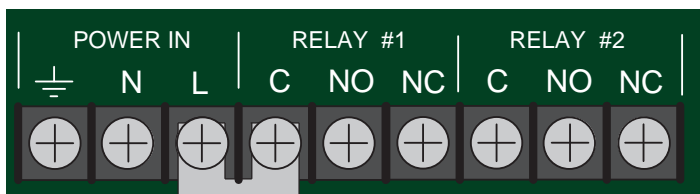
## Operating Principles

When a zone has a demand from a thermostat (TT or R W) the relay will close sending 120 VAC to Relay #1 NO terminal and switching the pump on, and the C to NO dry contact on relay #2 closes, signaling the boiler of a heating demand.



R, W, C and T T Comm dual labeling at thermostat terminals. Compatible with low voltage 2, 3, or 4 wire thermostats or any other low voltage devices having a switching action.

Supply 120 VAC hot to terminal L and 120 VAC neutral to N. A factory installed jumper from L terminal to the C terminal of Relay 1 is supplied for simplified pump connection.



If dry contacts are desired from relay #1, remove the factory installed jumper between L and C.

## Cover removal



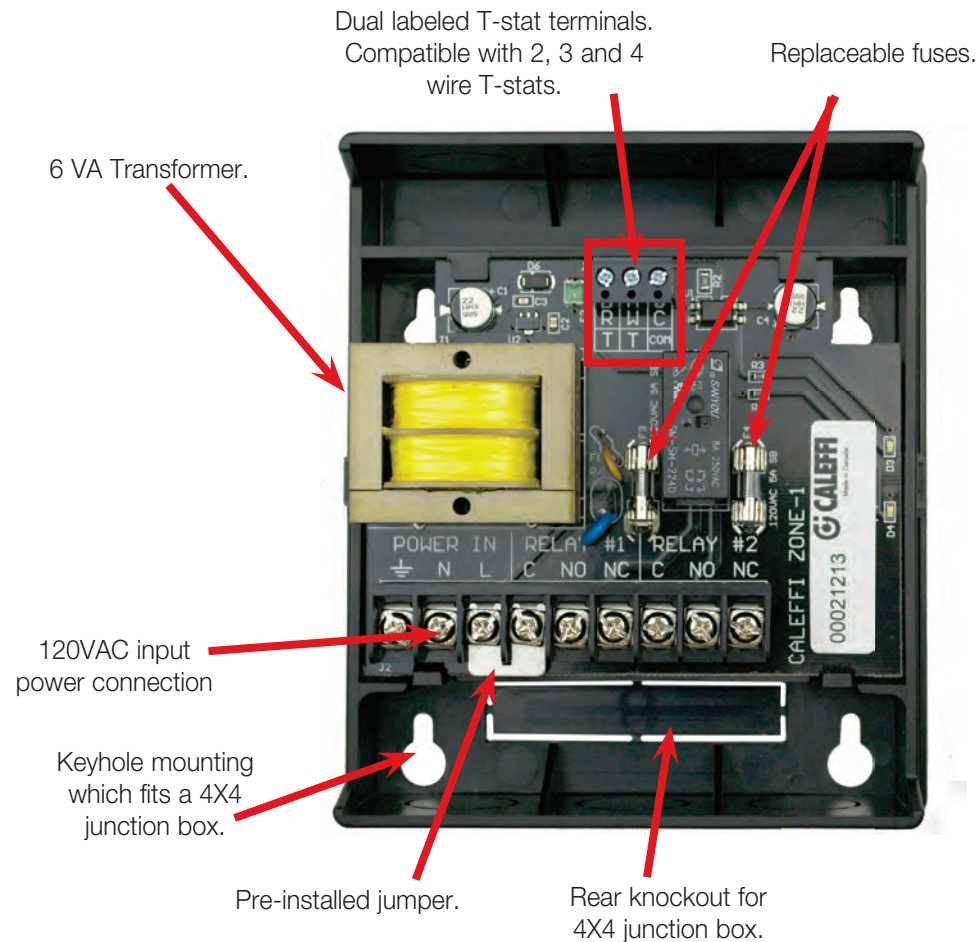
Hold either the left or the right end of the box up and at an angle. Use body for stabilizing relay box. Insert screwdriver and push tab inward.



Turn box and repeat inserting screwdriver and pushing tab inward on opposite side, cover should release from base.

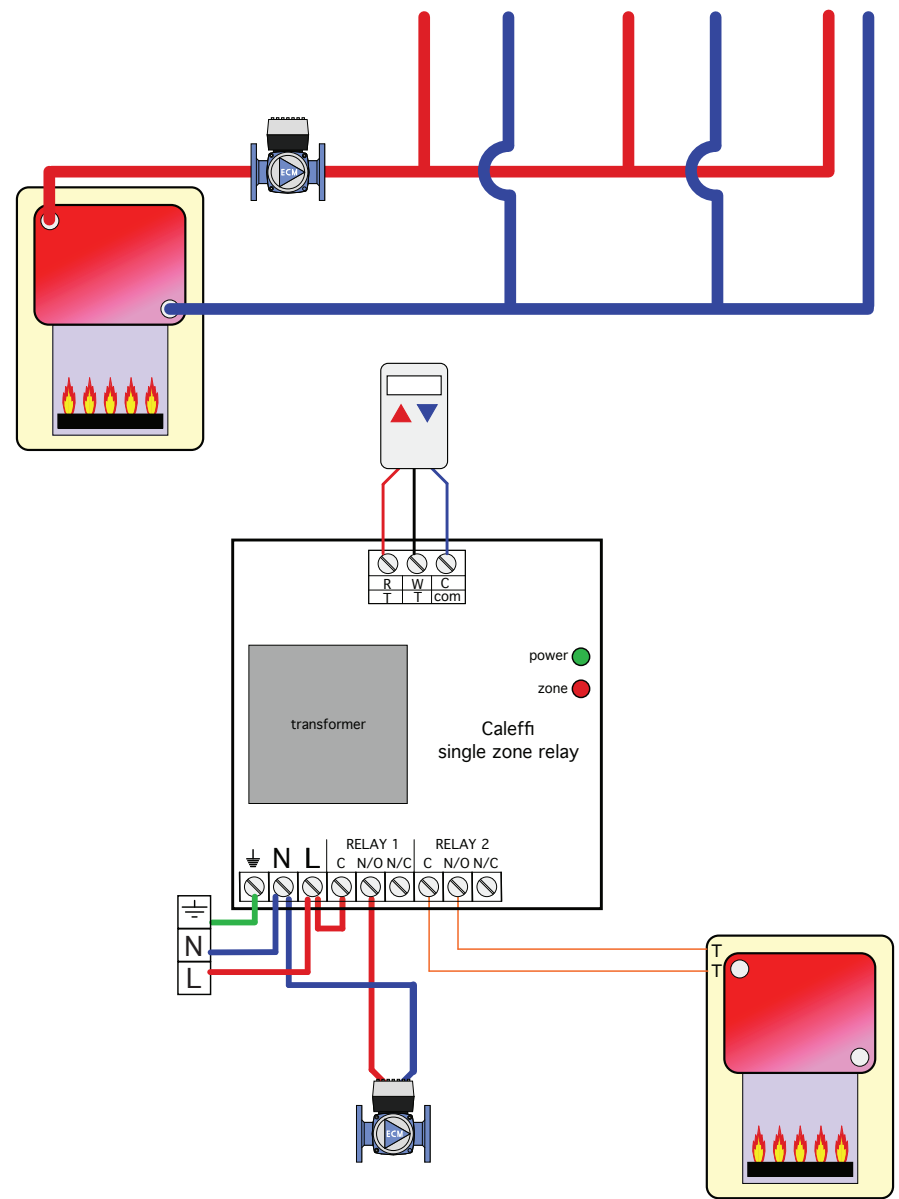


Slide cover off base.



**Mounting:** Do not mount to a surface that exceeds 115°F (45°C). The unit must be only located in dry interior locations. Use only copper conductor supply wire suitable for at least 105° C. All circuits must have a common disconnect and be connected to the same pole of the disconnect. It is not suitable for installation in hazardous locations.

# A1 - Single thermostat



Hydronic diagram is for illustration purposes only, some components have been removed for simplicity.



## Description of terminals

⏏	= Ground
N	= Neutral (Common leg of 120 VAC)
L	= Line (live leg of 120 VAC)
C	= Common terminal
NO	= Normally Open terminal
NC	= Normally Closed terminal

Note: There is a factory installed jumper between the 120 VAC line (L) and the common terminal of relay #1 (C).

## Thermostat terminals

R	= 24 VAC
W	= Heat call
C	= Common of 24 VAC

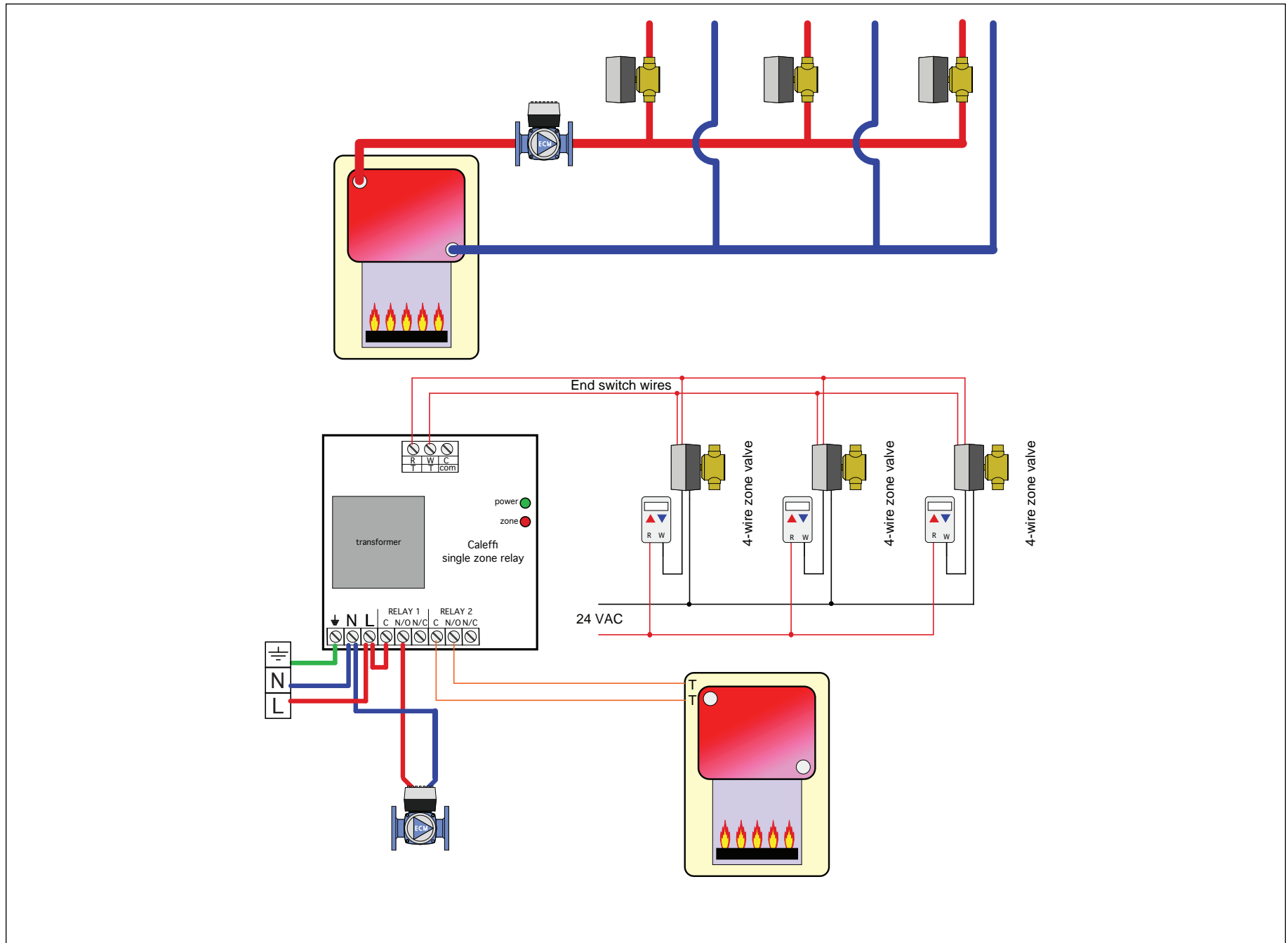
## Sequence of Operation / Settings

- A demand occurs from the thermostat closing R to W on the ZSR101 control. The “ZONE” LED illuminates.
- The ZSR101 control will power relay #1 and #2 closing C to NO.
- The NO terminal of relay #1 will send out 120 VAC to your pump. Relay #2 provides a dry contact closure to signal the boiler of a demand.
- **NOTE:** Relay #1 can be used as a dry contact as well by removing the factory installed jumper between L and C.
- When the thermostat demand is satisfied R to W will open and the “ZONE” LED will turn off.
- The control will remove power from relays #1 and #2 opening C to NO. This will drop 120 VAC to your pump and terminate the demand to your boiler.



**WARNING:** NEVER CONNECT R & C DIRECTLY, this will be a direct short on the 24 VAC supply

## A2 - Multiple thermostats



Hydronic diagram is for illustration purposes only and could be missing system components.

## Description of terminals

⏏	= Ground
N	= Neutral (Common leg of 120 VAC)
L	= Line (live leg of 120 VAC)
C	= Common terminal
NO	= Normally Open terminal
NC	= Normally Closed terminal

Note: There is a factory installed jumper between the 120 VAC line (L) and the common terminal of relay #1 (C).

### Thermostat terminals

R	= 24 VAC
W	= Heat call
C	= Common of 24 VAC

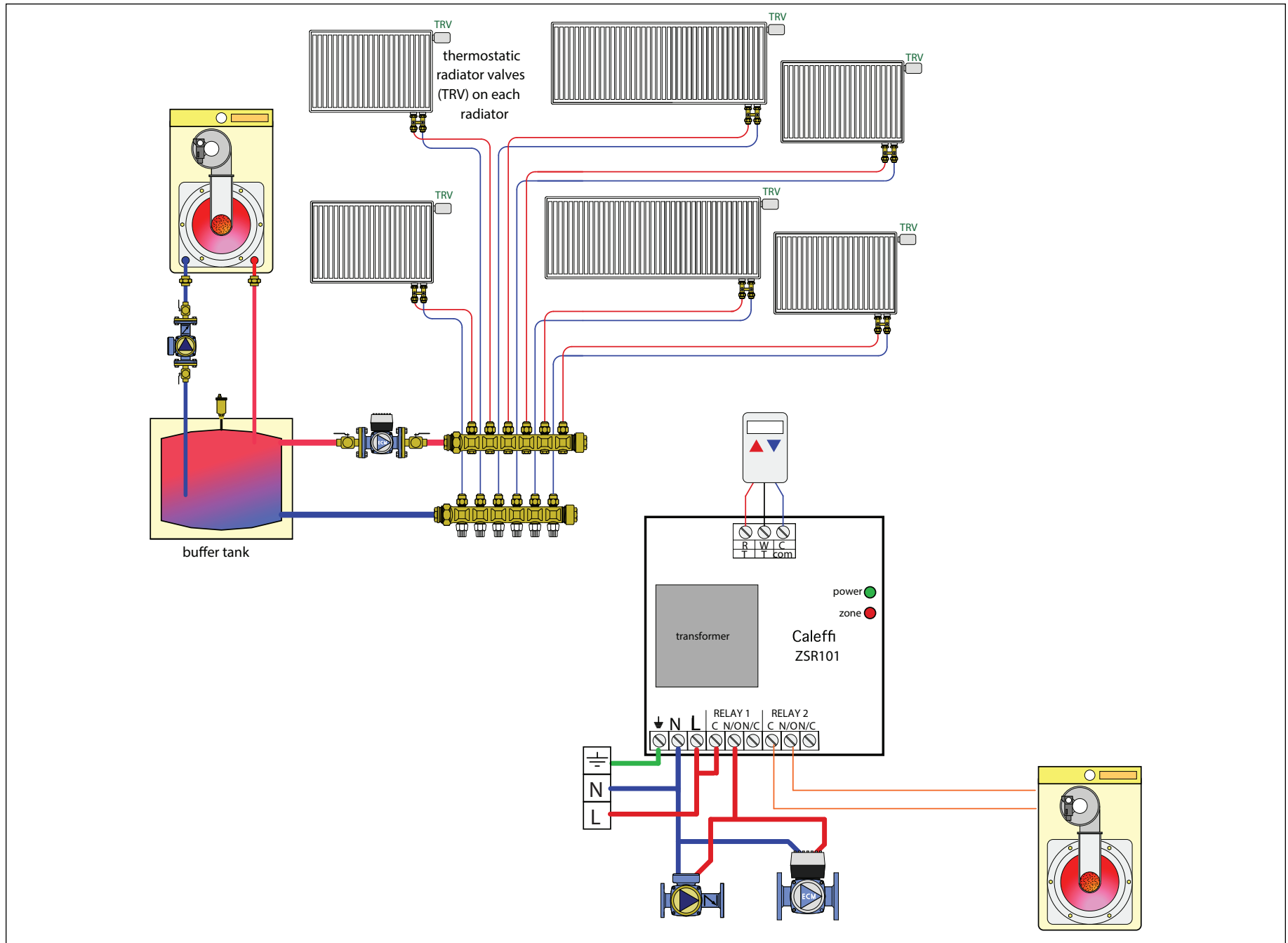
## Sequence of Operation / Settings

- A demand occurs from one of the thermostats which sends power (from a separately sourced transformer) to the corresponding zone valve.
- When the zone valve opens the end switch will close R to W on the ZSR101 control. The “ZONE” LED illuminates.
- The ZSR101 control will power relay #1 and #2 closing C to NO.
- The NO terminal of relay #1 will send out 120 VAC to your pump. Relay #2 provides a dry contact closure to signal the boiler of a demand.
- **NOTE:** Relay #1 can be used as a dry contact as well by removing the factory installed jumper between L and C.
- When all the thermostat demands are satisfied the zone valves will close and the end switch will open R to W. The “ZONE” LED will turn off.
- The control will remove power from relays #1 and #2 opening C to NO. This will drop 120 VAC to your pump and terminate the demand to your boiler.



**WARNING:** NEVER CONNECT R & C DIRECTLY, this will be a direct short on the 24 VAC supply

# A3 - Single master thermostat, panel radiators with TRVs, variable speed pump



Hydronic diagram is for illustration purposes only, some components have been removed for simplicity.

## Description of terminals

⏏	= Ground
N	= Neutral (Common leg of 120 VAC)
L	= Line (live leg of 120 VAC)
C	= Common terminal
NO	= Normally Open terminal
NC	= Normally Closed terminal

Note: There is a factory installed jumper between the 120 VAC line (L) and the common terminal of relay #1 (C).

## Thermostat terminals

R	= 24 VAC
W	= Heat call
C	= Common of 24 VAC



**WARNING:** NEVER CONNECT R & C DIRECTLY, this will be a direct short on the 24 VAC supply

## Sequence of Operation / Settings

- A demand occurs from the thermostat closing R to W on the ZSR101 control. The “ZONE” LED illuminates.
- The ZSR101 control will power relay #1 and #2 closing C to NO.
- The NO terminal of relay #1 will send out 120 VAC to your pumps. Relay #2 provides a dry contact closure to signal the boiler of a demand.
- **NOTE:** Relay #1 can be used as a dry contact as well by removing the factory installed jumper between L and C.
- When the thermostat demand is satisfied R to W will open and the “ZONE” LED will turn off.
- The control will remove power from relays #1 and #2 opening C to NO. This will drop 120 VAC to your pumps and terminate the demand to your boiler.
- **NOTE:** In this application, the single thermostat will be set to a slightly higher temperature than the desired room temperatures. The room temperatures will then be controlled by each individual thermostatic radiator valve by adjusting the flow through the radiator making this a fitting application for a variable speed (ECM) pump (between the buffer tank and radiators). When the temperature drops below the set point of the thermostat the boiler will maintain the buffer tank at its target temperature. Ideally, the boiler will operate on an outdoor reset curve to maximize efficiency and use a system temperature sensor located in the upper portion of the buffer tank.



Certified to CSA C22-2 No.24  
Conforms to UL Standard 873

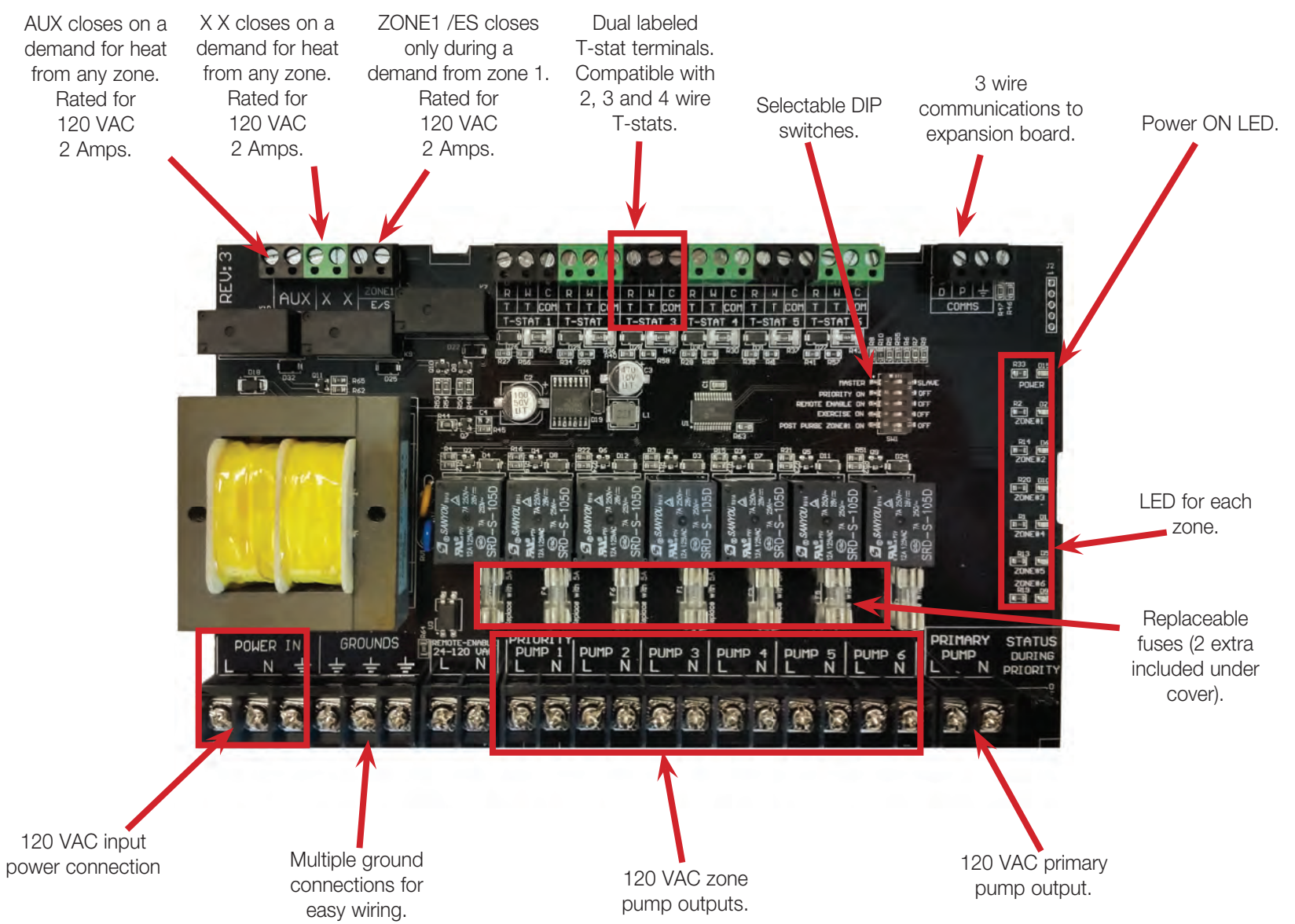
# Z-one™ Relay

## ZSR 10X - Multi-Zone Pump Control

### Overview

- Compatible with low voltage 2, 3, or 4 wire thermostats
- R, W, C and TT Comm dual labeling at thermostat terminals
- Z-oneLink unlimited zone expansion
- 120 VAC pump outputs
- Selectable priority with 1 hour time-out feature
- Selectable post purge and exercise
- Dry contacts (XX, AUX, ZONE 1 E/S) capable of switching line voltage
- High capacity transformer
- Large terminal connections
- Simplified wiring with extra ground terminals
- Heavy duty sealed relays
- Fuse protected (with spare fuse)
- Front LED lights
- 100% Factory tested with 3 year warranty
- ETL approved

See technical brochure 01286 NA for more product information.



## Cover removal



Hold either the left or the right end of the box up and at an angle. Use body for stabilizing relay box.



Insert screwdriver and push tab inward, cover should release from base.



Roll cover off base.



**Mounting:** Do not mount to a surface that exceeds 115°F (45°C). The unit must be only located in dry interior locations. Use only copper conductor supply wire suitable for at least 105° C. All circuits must have a common disconnect and be connected to the same pole of the disconnect. It is not suitable for installation in hazardous locations.

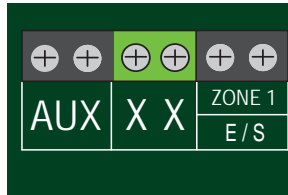


**Maintenance and Repair:** The Caleffi Z-one™ multi-zone pump control comes with two spare fuses. If control fails or is damaged, replace control with functional one.

**Boiler connections:**

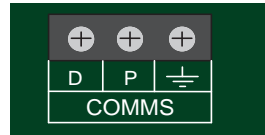
**XX** = Dry contact rated up to 120 VAC, 2 Amps, which is typically connected to TT on boiler control, closes when any zone calls including priority.

**ZONE 1 E/S** = Dry contact rated up to 120 VAC, 2 Amps, will close with any call to ZONE 1. Zone 1 can be enabled as a priority zone, typically used for heating domestic hot water. The ZONE 1 E/S can be used to close a DHW contact on boiler controls equipped with these features. **AUX** = Dry contact, rated up to 120 VAC, 2 Amps, close when any zone calls and can be used as signal to a variable speed self regulated pump or other controls.



**Communication connections:**

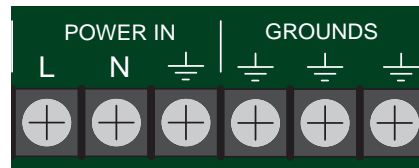
Connect terminals to matching terminal of slave boards D to D, P to P, Ground to Ground. Use 18 gauge thermostat wire and it should be shielded if located in close proximity to high voltage wiring.



**Input Power:**

L = Line (hot leg) of 120 VAC supply  
 N = Neutral of 120 VAC  
 ≍ = Ground

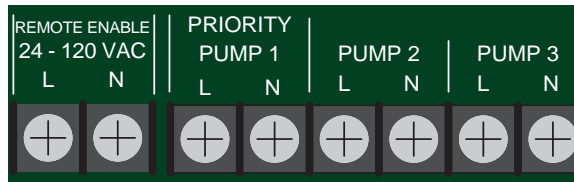
Note: when connecting 2 or more Z-one controls, all controls must be powered by the same 120 VAC circuit.



**Zone pump outputs:**

Zone pumps run when corresponding thermostat initiates a demand.

GROUND = Connect the ground from the pump to the ground terminal. **PRIORITY PUMP** = Runs when zone #1 calls. Can be programmed to be the priority zone. L = Line (hot leg) of 120 VAC to power the pump, N = Neutral leg of 120 VAC to power the pump. Remote Enable allows for input of 24-120 VAC from a boiler to allow the zone pumps to operate. When power is removed from Remote Enable, zone pumps will not be allowed to operate. This is useful during warm weather shut down to stop zone pumps from running or if your boiler controls are used to handle priority (DHW) demand and need the zone pumps to be off during the priority demand. Even with power removed from Remote Enable, the ZSR board stays powered to supply power to the thermostats.



The ZSR series of control is programmed by positioning five dip switches for the following operations.

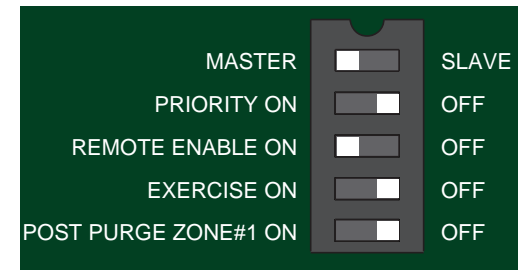
**Master / Slave:** allows for unlimited expansion to additional ZVR or ZSR relays. Only one Master.

**Priority ON / OFF:** When priority switch is ON, upon demand to TSTAT 1, ZONE 1 will operate as priority and all other zones are temporarily switched off (with 1 hour time-out). When priority is OFF, any zones that were active when ZONE 1 was switched on will remain on.

**Remote Enable ON / OFF:** When remote enable mode is ON, the board will hold off all zones waiting for an external 24 - 120 VAC voltage from the boiler.

**Exercise ON / OFF:** When exercise mode is ON, each circulator is switched on for 30 seconds following 72 hours of inactivity.

**Post Purge Zone #1 ON / OFF:** When post purge is ON, Zone 1 pump continues operating for 2 minutes after the priority zone is switched OFF.

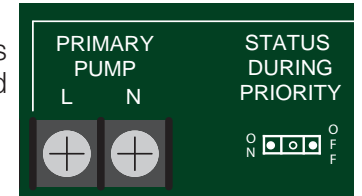


**Primary pump output:**

Primary pump runs when any zone pump runs. Its status during priority (on/off) can be programmed using the jumper pins.

L = Line (hot leg) of 120 VAC to power the pump  
 N = Neutral leg of 120 VAC to power the pump

**Status During Priority ON / OFF:** If priority is enabled and the jumper is placed on the ON pins, the primary pump will continue to operate during ZONE 1 demand. When jumper is placed on OFF pins, the primary pump will be OFF during ZONE 1 demand.



**WARNING:** NEVER CONNECT R & C DIRECTLY, this will be a direct short on the 24 VAC supply.

**WARNING:** When connecting 2 or more Z-one controls, all controls must be powered by the same 120 VAC circuit.

**WARNING:** When replacing fuses, make sure power is disconnected to control box.



## Description of terminals

- ⏏ = Ground
- N = Neutral (Common leg of 120 VAC)
- L = Line (Hot leg of 120 VAC)

### Thermostat terminals

- R = 24 VAC
- W = Heat call
- C = Common of 24 VAC

### Boiler terminals

**XX** = Dry contact rated up to 120 VAC, 2 Amps, which is typically connected to TT on boiler control, closes when any zone calls including priority.

**ZONE 1 E/S** = Dry contact rated up to 120 VAC, 2 Amps, will close with any call to ZONE 1. Zone 1 can be enabled as a priority zone, typically used for heating domestic hot water. The ZONE 1 E/S can be used to close a DHW contact on boiler controls equipped with these features. **AUX** = Dry contact, rated up to 120 VAC, 2 Amps, close when any zone calls and can be used as signal to a variable speed self regulated pump or other controls.

### Dip switch description

**Master / Slave:** allows for unlimited expansion to additional ZVR or ZSR relays. Only one Master.

**Priority ON / OFF:** When priority switch is ON, upon demand to TSTAT 1, ZONE 1 will operate as priority and all other zones are temporarily switched off (with 1 hour time-out). When priority is OFF, any zones that were active when ZONE 1 was switched on will remain on.

**Remote Enable ON / OFF:** When remote enable mode is ON, the board will hold off all zones waiting for an external 24 - 120 VAC voltage from the boiler.

**Exercise ON / OFF:** When exercise mode is ON, each circulator is switched on for 30 seconds following 72 hours of inactivity.

**Post Purge Zone #1 ON / OFF:** When post purge is ON, Zone 1 pump continues operating for 2 minutes after the priority zone is switched OFF.

## Sequence of Operation / Settings

- Master / Slave switch: **Master**
- Priority Switch: **OFF**
- Remote Enable Switch: **OFF**
- Exercise Switch: **OFF**
- Post Purge Zone 1 Switch: **OFF**
- Status During Priority Jumper: **OFF**
- A demand occurs from any thermostat closing R to W. The “PUMP ON” LED illuminates for the corresponding zone.
- ZSR control sends 120 VAC to corresponding zone pump and the primary pump output. The control will close the XX contacts to signal the boiler of a demand.
- When the demand from the last thermostat calling is satisfied (thermostat opens R to W), the XX contacts are opened and the “PUMP ON” LED turns off. The 120 VAC to the zone pump and primary pump outputs are dropped.



**WARNING:** NEVER CONNECT R & C DIRECTLY, this will be a direct short on the 24 VAC supply



## Description of terminals

- ⏏ = Ground
- N = Neutral (Common leg of 120 VAC)
- L = Line (Hot leg of 120 VAC)

## Thermostat terminals

- R = 24 VAC
- W = Heat call
- C = Common of 24 VAC

## Boiler terminals

**XX** = Dry contact rated up to 120 VAC, 2 Amps, which is typically connected to TT on boiler control, closes when any zone calls including priority.

**ZONE 1 E/S** = Dry contact rated up to 120 VAC, 2 Amps, will close with any call to ZONE 1. Zone 1 can be enabled as a priority zone, typically used for heating domestic hot water. The ZONE 1 E/S can be used to close a DHW contact on boiler controls equipped with these features. **AUX** = Dry contact, rated up to 120 VAC, 2 Amps, close when any zone calls and can be used as signal to a variable speed self regulated pump or other controls.

## Dip switch description

**Master / Slave:** allows for unlimited expansion to additional ZVR or ZSR relays. Only one Master.

**Priority ON / OFF:** When priority switch is ON, upon demand to TSTAT 1, ZONE 1 will operate as priority and all other zones are temporarily switched off (with 1 hour time-out). When priority is OFF, any zones that were active when ZONE 1 was switched on will remain on.

**Remote Enable ON / OFF:** When remote enable mode is ON, the board will hold off all zones waiting for an external 24 - 120 VAC voltage from the boiler.

**Exercise ON / OFF:** When exercise mode is ON, each circulator is switched on for 30 seconds following 72 hours of inactivity.

**Post Purge Zone #1 ON / OFF:** When post purge is ON, Zone 1 pump continues operating for 2 minutes after the priority zone is switched OFF.

## Sequence of Operation / Settings

- Master / Slave switch: **Master**
- Priority Switch: **ON**
- Remote Enable Switch: **OFF**
- Exercise Switch: **OFF**
- Post Purge Zone 1 Switch: **OFF**
- Status During Priority Jumper: **OFF**
- A demand occurs from a thermostat on zones 2-6 closing R to W. The "PUMP ON" LED illuminates for the corresponding zone.
- ZSR control sends 120 VAC to corresponding zone pump. The control will close the XX contacts to signal the boiler of a demand. The PRIMARY PUMP output will also deliver 120 VAC even if no pump is wired to it.
- When the demand from the thermostat is satisfied R to W will open and the "PUMP ON" LED for the corresponding zone will turn off.
- 120 VAC is dropped to the corresponding zone pump terminals.
- If no other zones are calling for heat, 120 VAC is dropped to the PRIMARY PUMP and the XX contacts will open terminating the demand for heat to the boiler.
- If a demand occurs from the DHW aquastat (T-STAT 1), the "PUMP ON" LED illuminates for zone 1.
- If any other zone was calling for heat (zones 2-6) when zone 1 is calling 120 VAC is dropped to the pumps on zones 2-6.
- The XX and the ZONE 1 E/S contacts close to signal a DHW demand to the boiler.
- The PRIORITY PUMP 1 output delivers 120 VAC.

- Once the DHW aquastat (T-STAT 1) is satisfied it will open R to W and 120 VAC to PRIORITY PUMP 1 is dropped. The ZONE 1 E/S contacts open.
- If a call for heat exists from zones 2-6 the corresponding "PUMP ON" LED will illuminate and 120 VAC will be delivered to those zone pumps. The XX contacts will remain closed to signal a heating demand to the boiler.
- When all the thermostat demands are satisfied R to W will open and the "PUMP ON" LEDs will turn off. The XX contacts will open terminating the demand for heat to the boiler. The 120 VAC is dropped to all of the zone pumps.

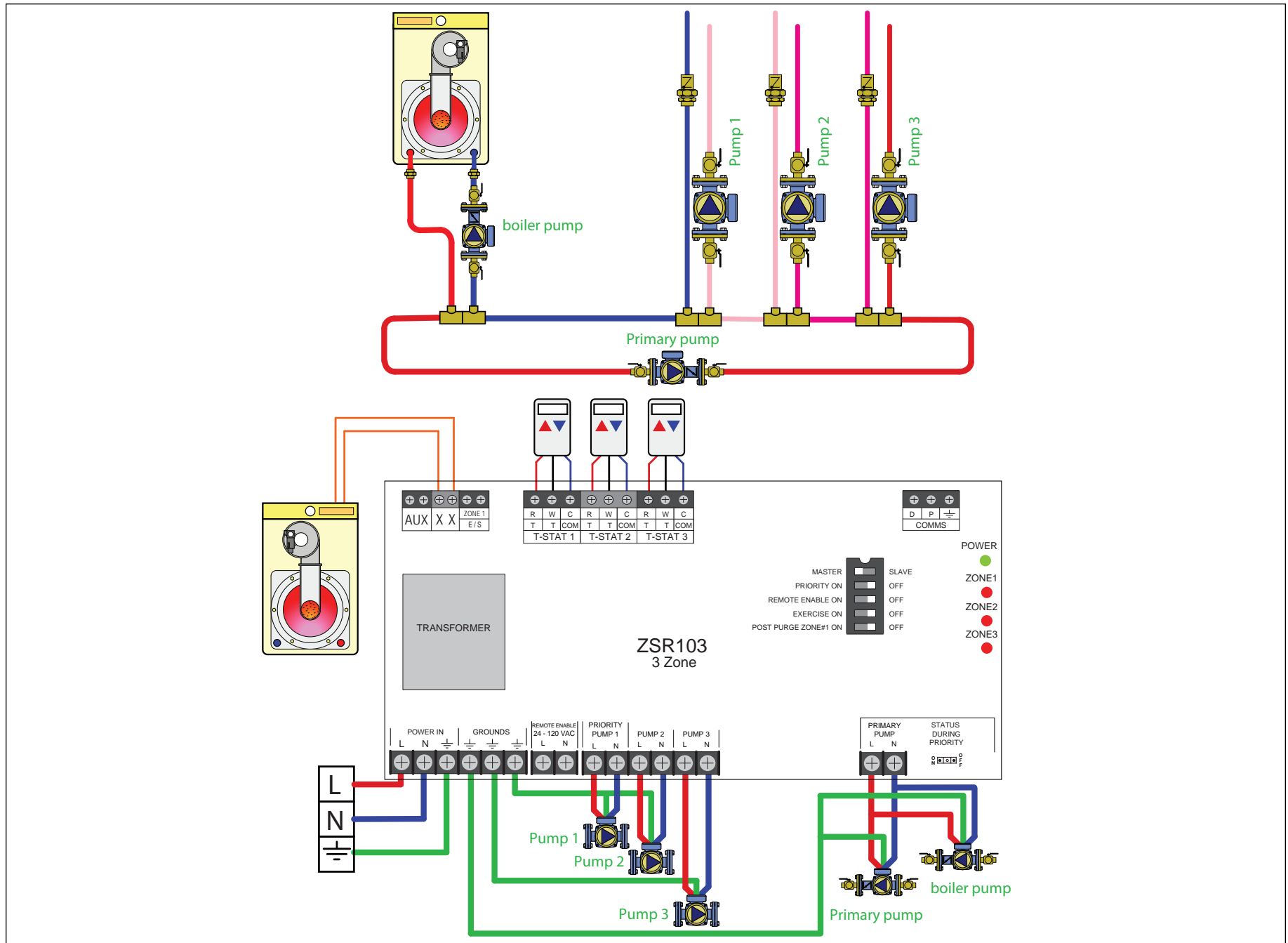
## DHW Time Out \ Freeze Prevention Feature

- After one hour of a priority demand, the control will open the ZONE 1 E/S contacts and drop power to PRIORITY PUMP 1.
- If a call for heat exists from zones 2-6, the control will satisfy those demands before going back to the priority demand.
- After zones 2-6 have been satisfied, the control will go back to the priority demand and reset the one hour timer.



**WARNING:** NEVER CONNECT R & C DIRECTLY, this will be a direct short on the 24 VAC supply

### B3 - Mod/Con boiler, primary loop, closely spaced tees, zone pumps



Hydronic diagram is for illustration purposes only, some components have been removed for simplicity.

## Description of terminals

- ⊥ = Ground  
N = Neutral (Common leg of 120 VAC)  
L = Line (Hot leg of 120 VAC)

### Thermostat terminals

- R = 24 VAC  
W = Heat call  
C = Common of 24 VAC

### Boiler terminals

**XX** = Dry contact rated up to 120 VAC, 2 Amps, which is typically connected to TT on boiler control, closes when any zone calls including priority.

**ZONE 1 E/S** = Dry contact rated up to 120 VAC, 2 Amps, will close with any call to ZONE 1. Zone 1 can be enabled as a priority zone, typically used for heating domestic hot water. The ZONE 1 E/S can be used to close a DHW contact on boiler controls equipped with these features. **AUX** = Dry contact, rated up to 120 VAC, 2 Amps, close when any zone calls and can be used as signal to a variable speed self regulated pump or other controls.

### Dip switch description

**Master / Slave:** allows for unlimited expansion to additional ZVR or ZSR relays. Only one Master.

**Priority ON / OFF:** When priority switch is ON, upon demand to TSTAT 1, ZONE 1 will operate as priority and all other zones are temporarily switched off (with 1 hour time-out). When priority is OFF, any zones that were active when ZONE 1 was switched on will remain on.

**Remote Enable ON / OFF:** When remote enable mode is ON, the board will hold off all zones waiting for an external 24 - 120 VAC voltage from the boiler.

**Exercise ON / OFF:** When exercise mode is ON, each circulator is switched on for 30 seconds following 72 hours of inactivity.

**Post Purge Zone #1 ON / OFF:** When post purge is ON, Zone 1 pump continues operating for 2 minutes after the priority zone is switched OFF.

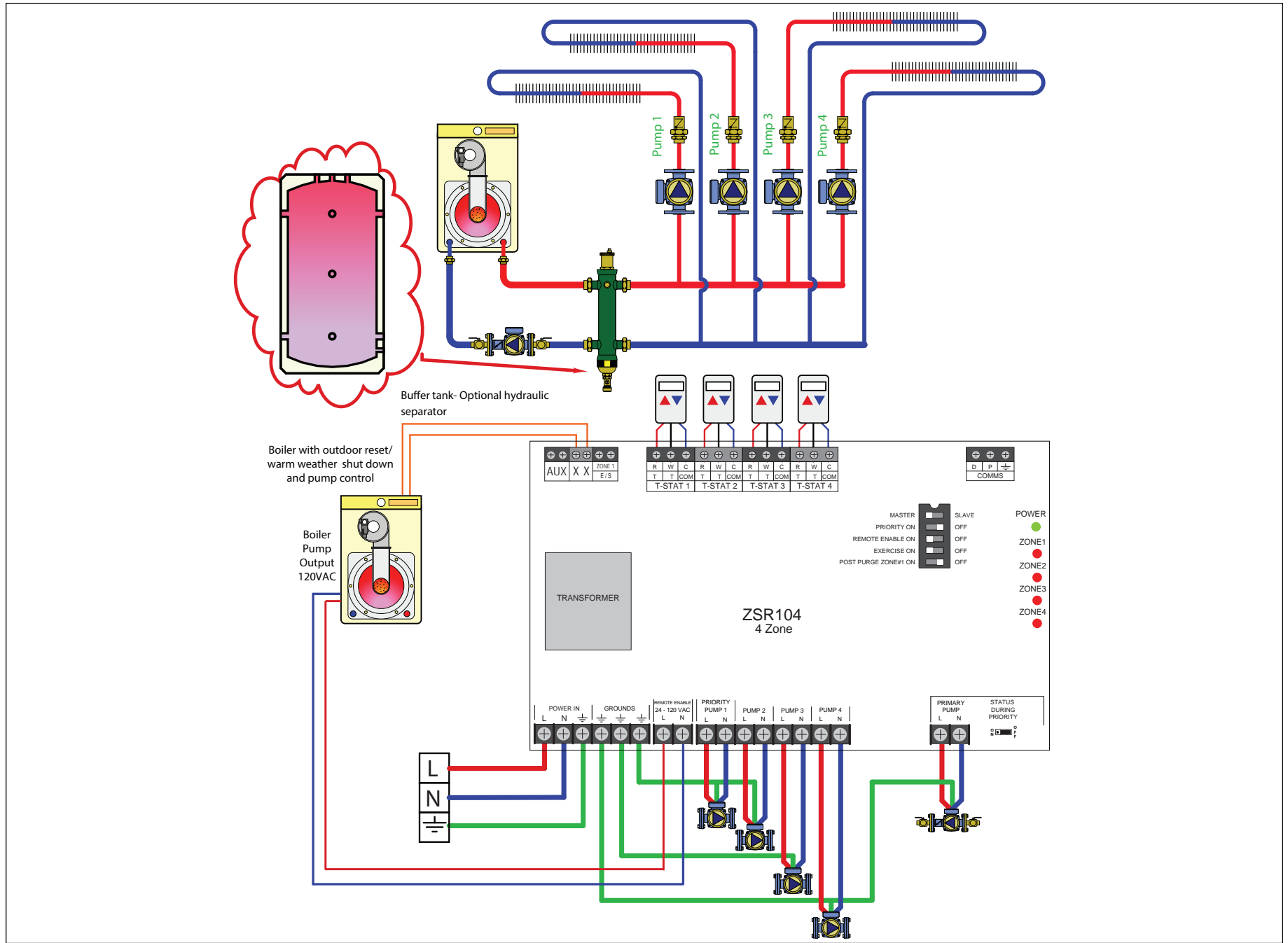
## Sequence of Operation / Settings

- Master / Slave switch: **Master**
- Priority Switch: **OFF**
- Remote Enable Switch: **OFF**
- Exercise Switch: **OFF**
- Post Purge Zone 1 Switch: **OFF**
- Status During Priority Jumper: **OFF**
- A demand occurs from any thermostat closing R to W. The “PUMP ON” LED illuminates for the corresponding zone.
- ZSR control sends 120 VAC to corresponding zone pump and the primary pump output. The control will close the XX contacts to signal the boiler of a demand.
- When the demand from the last thermostat calling is satisfied (thermostat opens R to W), the XX contacts are opened and the “PUMP ON” LED turns off. The 120 VAC to the zone pump and primary pump outputs are dropped.
- ALTERNATE WIRING: The boiler pump can be controlled by the boiler if it is equipped to do so.



**WARNING:** NEVER CONNECT R & C DIRECTLY, this will be a direct short on the 24 VAC supply

### B4 - Mod/con boiler with warm weather shut down, hydro separator or buffer tank, zone pumps



Hydronic diagram is for illustration purposes only, some components have been removed for simplicity.



## Description of terminals

- ⏏ = Ground
- N = Neutral (Common leg of 120 VAC)
- L = Line (Hot leg of 120 VAC)

### Thermostat terminals

- R = 24 VAC
- W = Heat call
- C = Common of 24 VAC

### Boiler terminals

**XX** = Dry contact rated up to 120 VAC, 2 Amps, which is typically connected to TT on boiler control, closes when any zone calls including priority.

**ZONE 1 E/S** = Dry contact rated up to 120 VAC, 2 Amps, will close with any call to ZONE 1. Zone 1 can be enabled as a priority zone, typically used for heating domestic hot water. The ZONE 1 E/S can be used to close a DHW contact on boiler controls equipped with these features. **AUX** = Dry contact, rated up to 120 VAC, 2 Amps, close when any zone calls and can be used as signal to a variable speed self regulated pump or other controls.

### Dip switch description

**Master / Slave:** allows for unlimited expansion to additional ZVR or ZSR relays. Only one Master.

**Priority ON / OFF:** When priority switch is ON, upon demand to TSTAT 1, ZONE 1 will operate as priority and all other zones are temporarily switched off (with 1 hour time-out). When priority is OFF, any zones that were active when ZONE 1 was switched on will remain on.

**Remote Enable ON / OFF:** When remote enable mode is ON, the board will hold off all zones waiting for an external 24 - 120 VAC voltage from the boiler.

**Exercise ON / OFF:** When exercise mode is ON, each circulator is switched on for 30 seconds following 72 hours of inactivity.

**Post Purge Zone #1 ON / OFF:** When post purge is ON, Zone 1 pump continues operating for 2 minutes after the priority zone is switched OFF.

## Sequence of Operation / Settings

- Master / Slave switch: **Master**
- Priority Switch: **OFF**
- Remote Enable Switch: **ON**
- Exercise Switch: **ON**
- Post Purge Zone 1 Switch: **OFF**
- Status During Priority Jumper: **OFF**
- A demand occurs from any thermostat closing R to W.
- ZSR control closes XX contacts to signal the boiler of a demand. Boiler receives demand and fires. Boiler control sends 120 VAC to boiler pump output.
- ZSR control receives 120 VAC at REMOTE ENABLE terminals from boiler pump output. The “PUMP ON” LED illuminates for the corresponding zone. ZSR control sends 120 VAC to corresponding zone pumps and the primary pump output.
- **NOTE:** Boilers equipped with a warm weather shutdown feature will not power the boiler pump output if outdoor temperature is above the warm weather shutdown setpoint. In this case the ZSR control will not receive 120 VAC at the REMOTE ENABLE terminals. Without power (24 – 120 VAC) at the REMOTE ENABLE terminals the ZSR control will not send 120 VAC to any pumps wired to the ZSR control.
- **NOTE:** The REMOTE ENABLE terminals are only using the power applied to them as a signal to allow the pumps wired to the ZSR control to operate. The power applied to the REMOTE ENABLE terminals is not used to power any of the pumps wired to the ZSR control.

- When the demand from the last thermostat calling is satisfied (thermostat opens R to W), the XX contacts are opened and the “PUMP ON” LED turns off. The 120 VAC to the zone pump and primary pump outputs are dropped.



**WARNING:** NEVER CONNECT R & C DIRECTLY, this will be a direct short on the 24 VAC supply



Certified to CSA C22-2 No.24  
Conforms to UL Standard 873

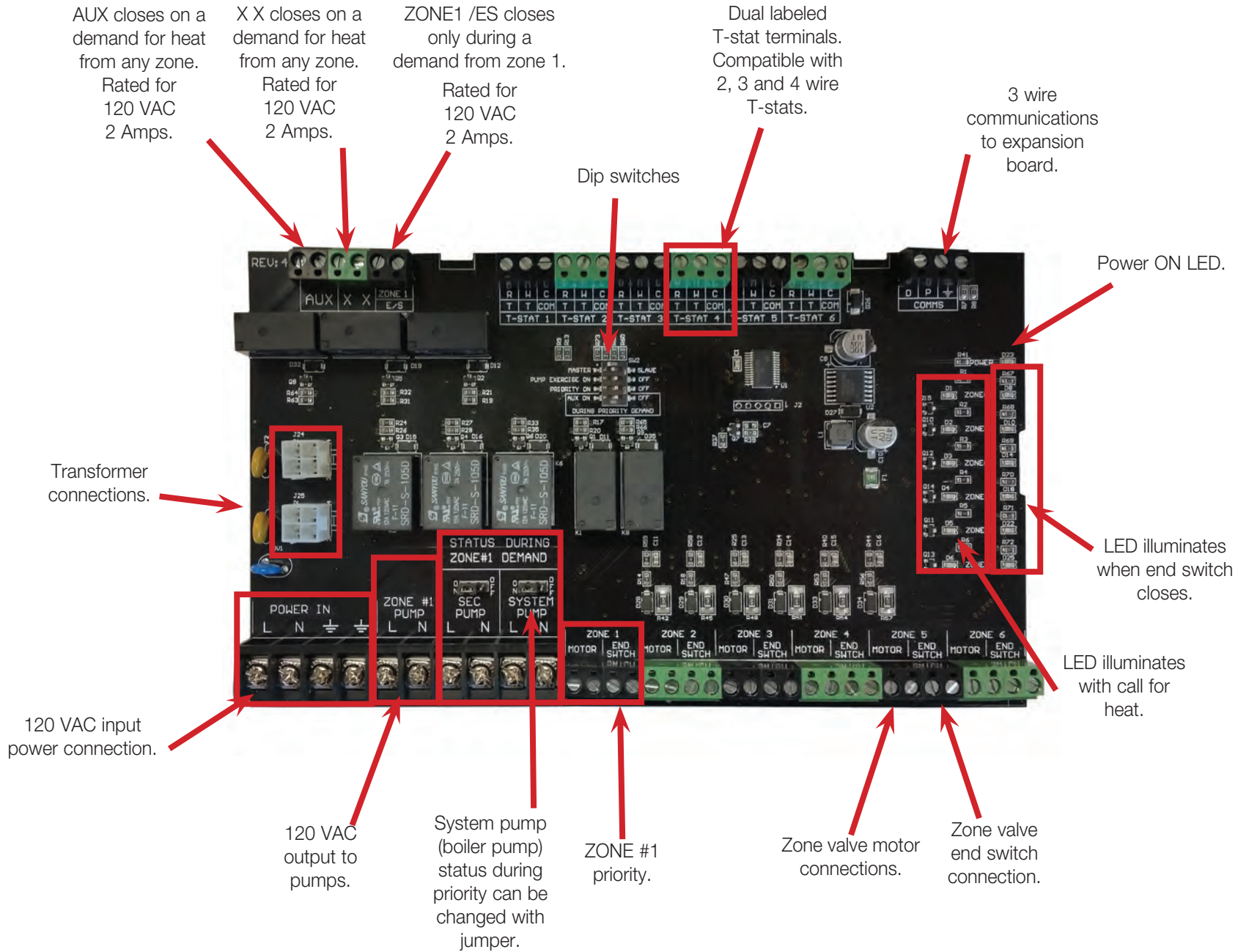
# Z-one<sup>™</sup> Relay

## ZVR10X - Multi-Zone Valve Control

### Overview

- Compatible with low voltage 2, 3, or 4 wire thermostats
- R, W, C and TT Comm dual labeling at thermostat terminals
- Z-oneLink unlimited zone expansion
- Selectable priority with 1 hour time-out feature
- System pump and Secondary pump status selectable during priority
- Pumps will start only after the zone valve end switch is closed
- Dry contacts (XX, AUX, ZONE 1 E/S) capable of switching line voltage
- Large terminal connections
- High capacity 40 VA transformer standard for 3 and 4 zone models-expandable to 80 VA, and 80 VA for the 6 zone model
- Automatic resettable fuse
- Controls system pump, secondary pump, and zone #1 pump
- Front LED Lights
- 100% Factory tested with 3 year warranty
- ETL approved

See technical brochure 01285 NA for more product information.



## Cover removal



Hold either the left or the right end of the box up and at an angle. Use body for stabilizing relay box.



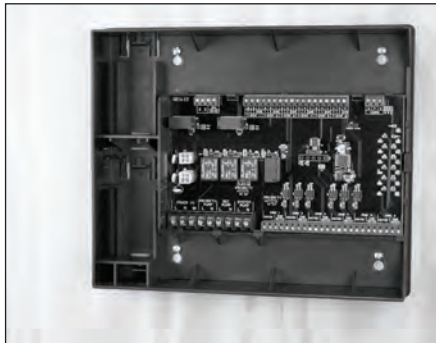
Insert screwdriver and push tab inward, cover should release from base.



Roll cover off base.



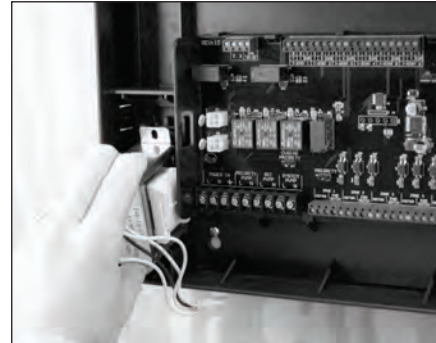
## Transformer Installation



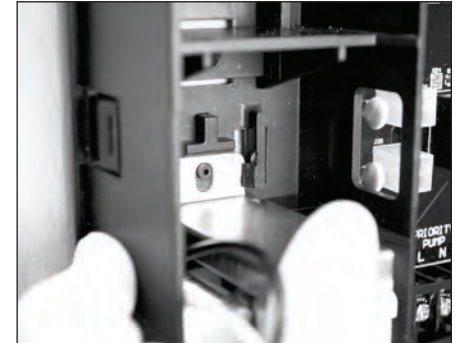
Mount box on stable surface using level.



Remove transformer(s) from packaging.



Slide bottom end of transformer into bottom latch.



Snap top of transformer into latch arms.



Feed wiring through hole near the top of the transformer and insert transformer plug into the socket.



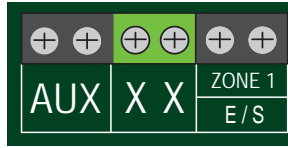
Repeat process for 2nd transformer if using six valve relay box.

**Mounting:** Do not mount to a surface that exceeds 115°F (45°C). The unit must be only located in dry interior locations. Use only copper conductor supply wire suitable for at least 105° C. All circuits must have a common disconnect and be connected to the same pole of the disconnect. It is not suitable for installation in hazardous locations.

**Maintenance and Repair:** The Caleffi Z-one™ multi-zone valve relay comes with a automatic resettable fuse and requires no maintenance. If control fails or is damaged, replace control with functional one.

**Boiler connections:**

**XX** = Dry contact rated up to 120 VAC, 2 Amps, which is typically connected to TT on boiler control, closes when any zone calls including priority. **ZONE 1 E/S** = Dry contact rated up to 120 VAC, 2 Amps, will close with any call to ZONE 1. Zone 1 can be enabled as a priority zone, typically used for heating domestic hot water. The ZONE 1 E/S can be used to close a DHW contact on boiler controls equipped with these features. **AUX** = Dry contact, rated up to 120 VAC, 2 Amps, close when any zone calls and can be used as signal to a variable speed self regulated pump or other controls.



**Communication connections:**

Connect terminals to matching terminal of slave boards D to D, P to P, Ground to Ground. Use 18 gauge thermostat wire and it should be shielded if located in close proximity to high voltage wiring



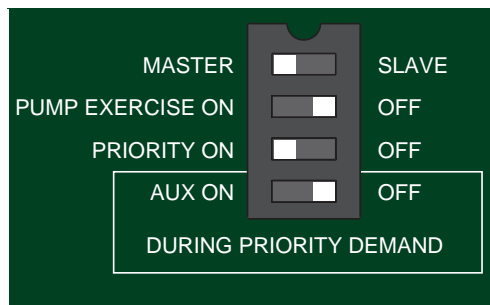
The ZVR series of controls is programmed by the dip switches which can be positioned for the following operations.

**Master / Slave:** allows for unlimited expansion to additional ZVR or ZSR relays.

**Pump Exercise ON / OFF:** When exercise mode is ON, each circulator is switched on for 30 seconds following 72 hours of inactivity.

**Priority ON / OFF:** When priority switch is ON, upon demand, Zone 1 will operate as priority and all other zones are temporarily switched off (with 1 hour time-out). When priority is OFF, any zones that were active when Zone 1 was switched on will remain on.

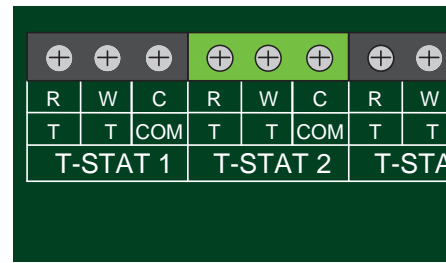
**AUX ON / OFF During Priority Demand:** When AUX switch is ON, the AUX dry contacts will close during a priority demand. When switch is OFF, the AUX dry contacts will remain open during a priority demand.



**WARNING:** NEVER CONNECT R & C DIRECTLY, this will be a direct short on the 24 VAC supply.

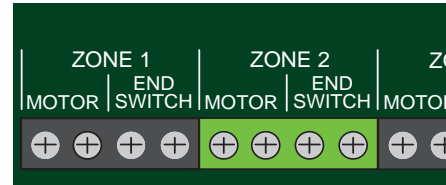
**WARNING:** When connecting 2 or more Z-one controls, all controls must be powered by the same 120 VAC circuit.

**Thermostat connections**



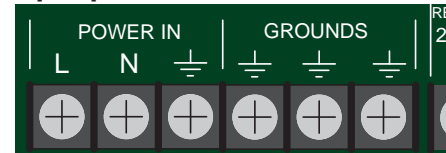
R = 24 VAC.  
W = Heat call  
C = Common of 24 VAC  
Heat demand is initiated by closing R to W.  
24 VAC is always present between R & C.

**Zone valve connections**



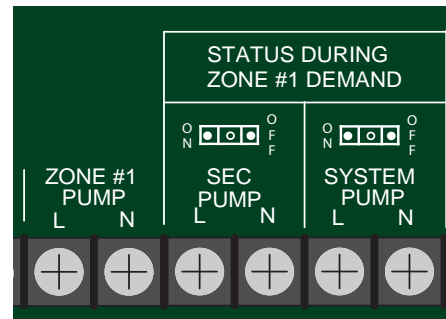
Motor = 24 VAC to power the zone valve motor  
End Switch = Connects to end switch on zone valve. Must be jumpered if using a 2-wire zone valve.

**Input power**



L = Line (hot leg) of 120 VAC supply  
N = Neutral of 120 VAC  
⏏ = Grounds

**Pump outputs**



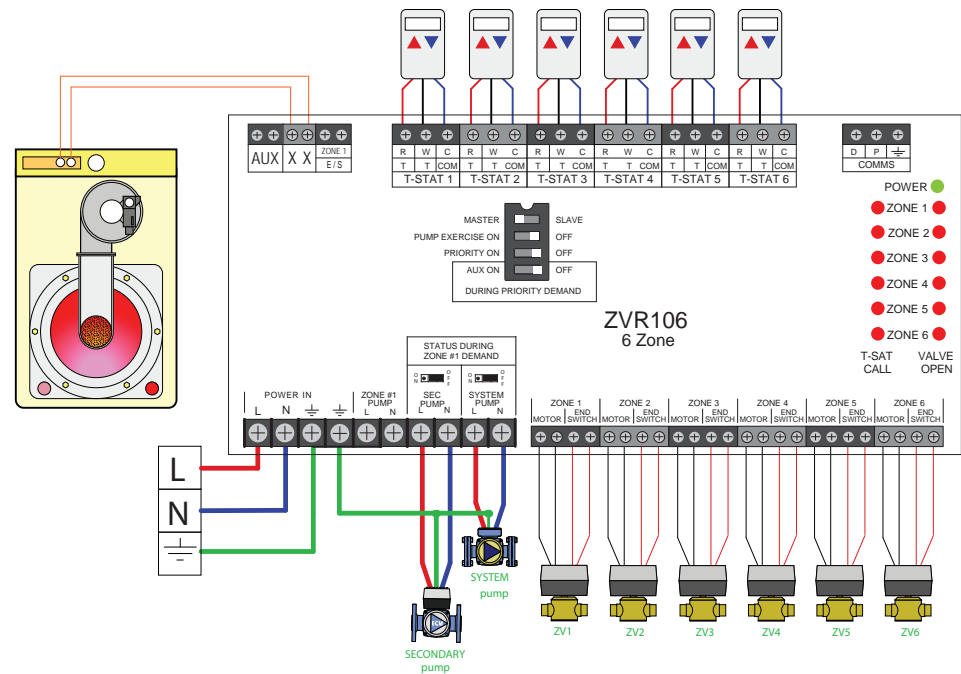
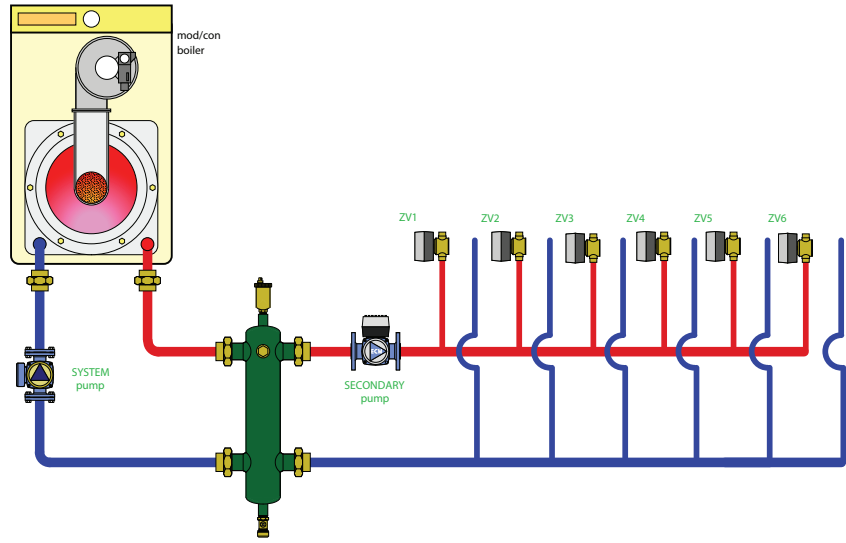
**SYSTEM PUMP** = Runs when any zone calls for heat.

**SEC PUMP** = Runs when any zone calls for heat.

**ZONE 1 PUMP** = Runs when zone 1 thermostat calls for heat and zone 1 end switch has closed. A jumper is required between the ZONE 1 END SWITCH terminals when using a pump for ZONE 1 instead of a zone valve.

**STATUS DURING ZONE 1 DEMAND ON / OFF** = When status jumper is placed on ON pins, the secondary and / or system pump will continue to operate during ZONE 1 demand. When jumper is placed on OFF pins, the corresponding pump will be OFF during ZONE 1 demand.

# C1 - Mod/Con boiler, hydro separator, zone valves



Hydronic diagram is for illustration purposes only, some components have been removed for simplicity.

## Description of terminals

- ⏏ = Ground
- N = Neutral (Common leg of 120 VAC)
- L = Line (Hot leg of 120 VAC)

### Thermostat terminals

- R = 24 VAC
- W = Heat call
- C = Common of 24 VAC

### Boiler terminals

**XX** = Dry contact rated up to 120 VAC, 2 Amps, which is typically connected to TT on boiler control, closes when any zone calls including priority.

**ZONE 1 E/S** = Dry contact rated up to 120 VAC, 2 Amps, will close with any call to ZONE 1. Zone 1 can be enabled as a priority zone, typically used for heating domestic hot water. The ZONE 1 E/S can be used to close a DHW contact on boiler controls equipped with these features.

**AUX** = Dry contact, rated up to 120 VAC, 2 Amps, close when any zone calls and can be used as signal to a variable speed self regulated pump or other controls.

### Pump terminals

**SYSTEM PUMP** = Runs when any zone calls for heat.

**SEC PUMP** = Runs when any zone calls for heat.

**ZONE 1 PUMP** = Runs when zone 1 thermostat calls for heat and zone 1 end switch has closed. A jumper is required between the ZONE 1 END SWITCH terminals when using a pump for ZONE 1 instead of a zone valve.

### STATUS DURING ZONE 1 DEMAND ON / OFF:

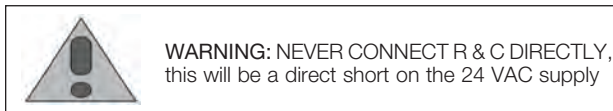
When status jumper is placed on ON pins, the secondary and / or system pump will continue to operate during Zone 1 demand. When jumper is placed on OFF pins, the corresponding pump will be OFF during Zone 1 demand.

### Valve terminals

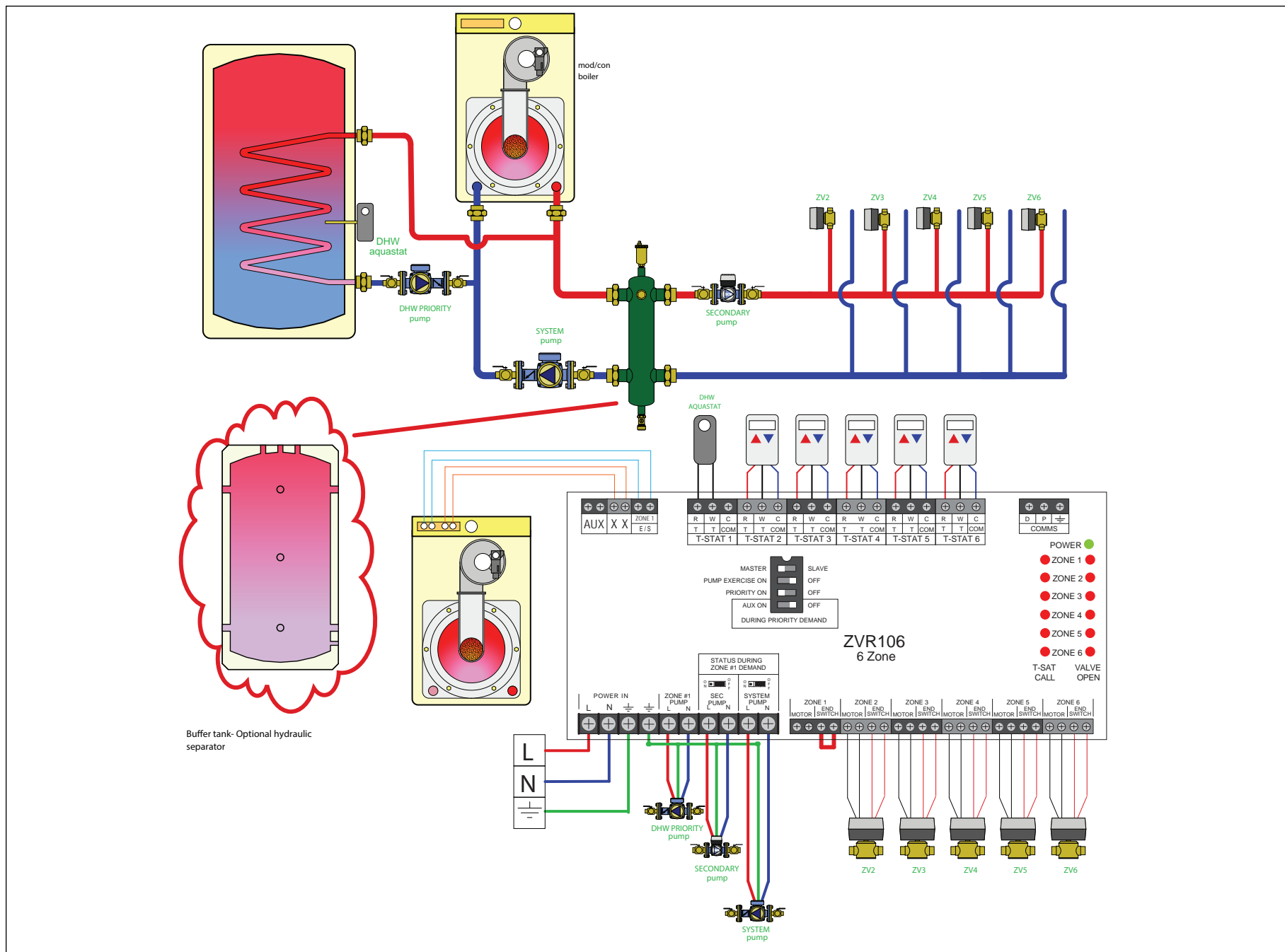
Motor = 24 VAC to power the zone valve motor  
End Switch = Connects to end switch on zone valve. Must be jumped if using a 2-wire zone valve.

## Sequence of Operation / Settings

- Master / Slave switch: **Master**
- Pump Exercise: **OFF**
- Priority: **OFF**
- AUX During Priority Demand: **OFF**
- System Pump Status During Zone 1 Demand Jumper: **OFF**
- Sec Pump Status During Zone 1 Demand Jumper: **OFF**
- A demand occurs from any thermostat closing R to W. The “T-STAT CALL” LED illuminates for the corresponding zone.
- ZVR control sends 24 VAC to the corresponding zone MOTOR terminals to open the zone valve.
- When the zone valve end switch closes, the “VALVE OPEN” LED illuminates for the corresponding zone. ZVR control sends 120 VAC to SYSTEM PUMP and SEC PUMP outputs. The control will close the XX contacts to signal the boiler of a demand.
- When the thermostat demand is satisfied R to W will open and the “T-STAT CALL” and “VALVE OPEN” LEDs will turn off. 24 VAC is dropped to the corresponding zone MOTOR terminals.
- If no other zones are calling for heat the XX contacts will open terminating the demand for heat to the boiler. The 120 VAC is dropped to the SYSTEM PUMP and SEC PUMP.



## C2 - Mod/Con boiler, priority indirect DHW on primary side of hydro sep, zone valves



Hydronic diagram is for illustration purposes only, some components have been removed for simplicity.



## Description of terminals

- ⊕ = Ground
- N = Neutral (Common leg of 120 VAC)
- L = Line (Hot leg of 120 VAC)

### Thermostat terminals

- R = 24 VAC
- W = Heat call
- C = Common of 24 VAC

### Boiler terminals

**XX** = Dry contact rated up to 120 VAC, 2 Amps, which is typically connected to TT on boiler control, closes when any zone calls including priority.

**ZONE 1 E/S** = Dry contact rated up to 120 VAC, 2 Amps, will close with any call to ZONE 1. Zone 1 can be enabled as a priority zone, typically used for heating domestic hot water. The ZONE 1 E/S can be used to close a DHW contact on boiler controls equipped with these features.

**AUX** = Dry contact, rated up to 120 VAC, 2 Amps, close when any zone calls and can be used as signal to a variable speed self regulated pump or other controls.

### Pump terminals

**SYSTEM PUMP** = Runs when any zone calls for heat.

**SEC PUMP** = Runs when any zone calls for heat.

**ZONE 1 PUMP** = Runs when zone 1 thermostat calls for heat and zone 1 end switch has closed. A jumper is required between the ZONE 1 END SWITCH terminals when using a pump for ZONE 1 instead of a zone valve.

### STATUS DURING ZONE 1 DEMAND ON / OFF:

When status jumper is placed on ON pins, the secondary and / or system pump will continue to operate during Zone 1 demand. When jumper is placed on OFF pins, the corresponding pump will be OFF during Zone 1 demand.

### Valve terminals

Motor = 24 VAC to power the zone valve motor  
End Switch = Connects to end switch on zone valve. Must be jumped if using a 2-wire zone valve.

## Sequence of Operation / Settings

- Master / Slave switch: **Master**
- Pump Exercise: **OFF**
- Priority: **ON**
- AUX During Priority Demand: **OFF**
- System Pump Status During Zone 1 Demand Jumper: **OFF**
- Sec Pump Status During Zone 1 Demand Jumper: **OFF**
- A demand occurs from a thermostat on zones 2-6 closing R to W. The “T-STAT CALL” LED illuminates for the corresponding zone.
- ZVR control sends 24 VAC to the corresponding zone MOTOR terminals to open the zone valve.
- When the zone valve end switch closes, the “VALVE OPEN” LED illuminates for the corresponding zone. ZVR control sends 120 VAC to SYSTEM PUMP and SEC PUMP outputs. The control will close the XX contacts to signal the boiler of a demand.
- When the thermostat demand is satisfied R to W will open and the “T-STAT CALL” and “VALVE OPEN” LEDs will turn off. 24 VAC is dropped to the corresponding zone MOTOR terminals.
- If no other zones are calling for heat the XX contacts will open terminating the demand for heat to the boiler. The 120 VAC is dropped to the SYSTEM PUMP and SEC PUMP.
- If a demand occurs from the DHW aquastat (T-STAT 1), the “T-STAT CALL” and the “VALVE OPEN” LEDs illuminate for zone 1. (When using a pump for zone 1 instead of a zone valve a jumper must be installed on the ZONE 1 END SWITCH terminals.)



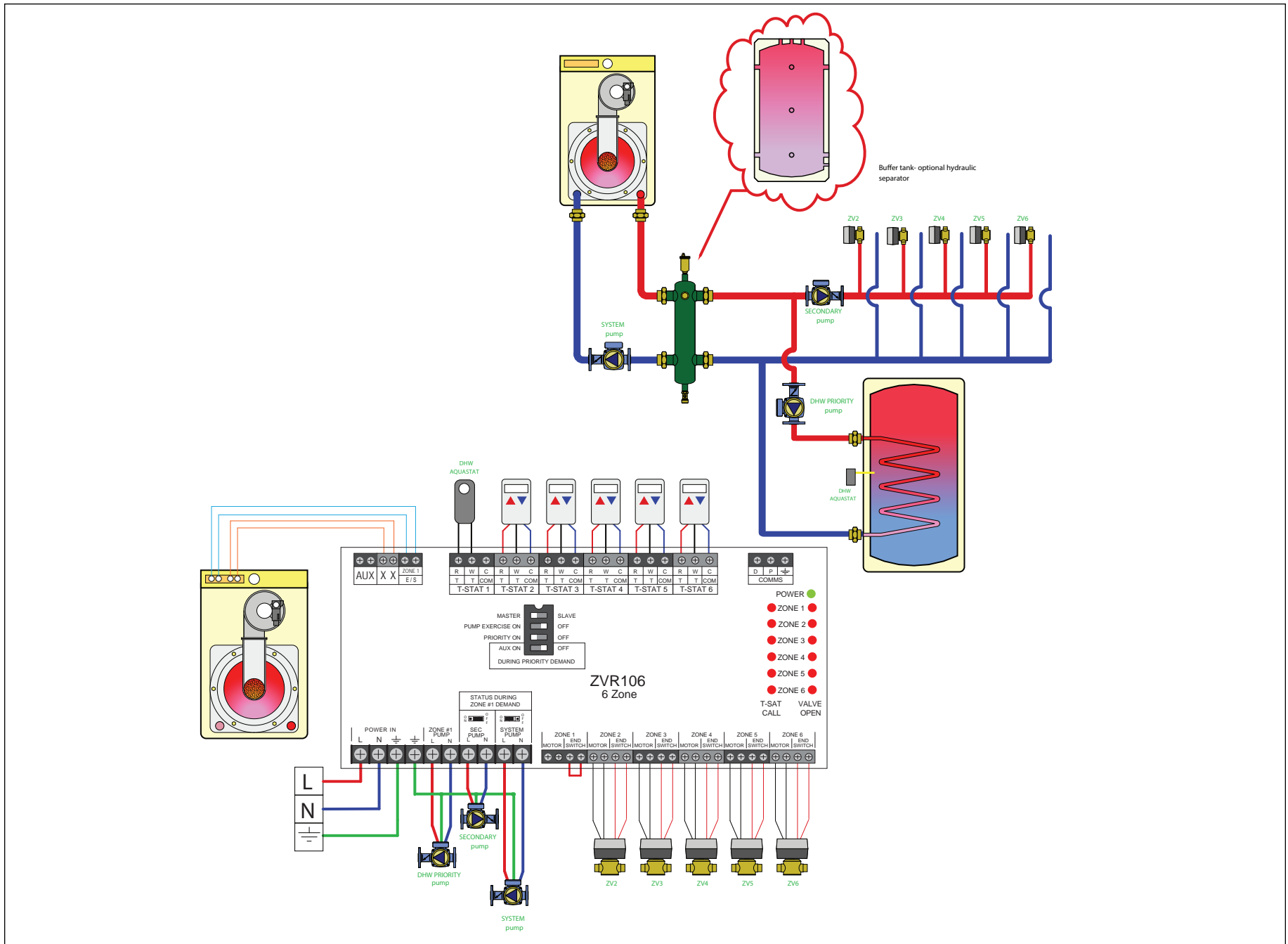
**WARNING: NEVER CONNECT R & C DIRECTLY,**  
this will be a direct short on the 24 VAC supply

- If any other zone was calling for heat (zones 2-6) when zone 1 is calling 24 VAC is dropped to those zone’s MOTOR terminals. The “T-STAT CALL” and “VALVE OPEN” LED will also turn off.
- The XX and the ZONE 1 E/S contacts close to signal a DHW demand to the boiler.
- The ZONE 1 PUMP output delivers 120 VAC.
- 120 VAC is dropped to the SYSTEM PUMP and SEC PUMP.
- Once the DHW aquastat (T-STAT 1) is satisfied it will open R to W and 120 VAC to ZONE 1 PUMP is dropped. The ZONE 1 E/S and XX contacts open.
- If a call for heat exists from zones 2-6 the corresponding “T-STAT CALL” will illuminate again and 24 VAC will be delivered to their zone MOTOR terminals.
- When the zone valve end switch closes, the “VALVE OPEN” LED illuminates for the corresponding zone. ZVR control sends 120 VAC to SYSTEM PUMP and SEC PUMP outputs. The control will close the XX contacts to signal the boiler of a demand.
- When all the thermostat demands are satisfied R to W will open and the “T-STAT CALL” and “VALVE OPEN” LEDs will turn off. The XX contacts will open terminating the demand for heat to the boiler. The 120 VAC is dropped to the SYSTEM PUMP and SEC PUMP.

### DHW Time Out \ Freeze Prevention Feature

- After one hour of a priority demand, the control will open the ZONE 1 E/S contacts and drop power to ZONE #1 PUMP and ZONE 1 MOTOR terminals.
- If a call for heat exists from zones 2-6, the control will satisfy those demands before going back to the priority demand.
- After zones 2-6 have been satisfied, the control will go back to the priority demand and reset the one hour timer.

### C3 - Mod/Con boiler, priority indirect DHW on load side of hydro sep, zone valves



Hydronic diagram is for illustration purposes only, some components have been removed for simplicity.

## Description of terminals

- ≡ = Ground
- N = Neutral (Common leg of 120 VAC)
- L = Line (Hot leg of 120 VAC)

### Thermostat terminals

- R = 24 VAC
- W = Heat call
- C = Common of 24 VAC

### Boiler terminals

**XX** = Dry contact rated up to 120 VAC, 2 Amps, which is typically connected to TT on boiler control, closes when any zone calls including priority.

**ZONE 1 E/S** = Dry contact rated up to 120 VAC, 2 Amps, will close with any call to ZONE 1. Zone 1 can be enabled as a priority zone, typically used for heating domestic hot water. The ZONE 1 E/S can be used to close a DHW contact on boiler controls equipped with these features.

**AUX** = Dry contact, rated up to 120 VAC, 2 Amps, close when any zone calls and can be used as signal to a variable speed self regulated pump or other controls.

### Pump terminals

**SYSTEM PUMP** = Runs when any zone calls for heat.

**SEC PUMP** = Runs when any zone calls for heat.

**ZONE 1 PUMP** = Runs when zone 1 thermostat calls for heat and zone 1 end switch has closed. A jumper is required between the ZONE 1 END SWITCH terminals when using a pump for ZONE 1 instead of a zone valve.

### STATUS DURING ZONE 1 DEMAND ON / OFF:

When status jumper is placed on ON pins, the secondary and / or system pump will continue to operate during Zone 1 demand. When jumper is placed on OFF pins, the corresponding pump will be OFF during Zone 1 demand.

### Valve terminals

Motor = 24 VAC to power the zone valve motor  
End Switch = Connects to end switch on zone valve. Must be jumped if using a 2-wire zone valve.

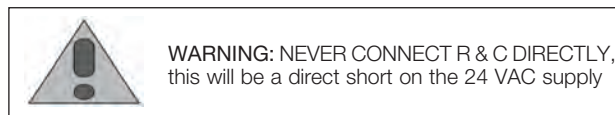
## Sequence of Operation / Settings

- Master / Slave switch: Master
- Pump Exercise: **OFF**
- Priority: **ON**
- AUX During Priority Demand: **OFF**
- Sec Pump Status During Zone 1 Demand Jumper: **OFF**
- System Pump Status During Zone 1 Demand Jumper: **ON**
- A demand occurs from a thermostat on zones 2-6 closing R to W. The “T-STAT CALL” LED illuminates for the corresponding zone.
- ZVR control sends 24 VAC to the corresponding zone MOTOR terminals to open the zone valve.
- When the zone valve end switch closes, the “VALVE OPEN” LED illuminates for the corresponding zone. ZVR control sends 120 VAC to SYSTEM PUMP and SEC PUMP outputs. The control will close the XX contacts to signal the boiler of a demand.
- When the thermostat demand is satisfied R to W will open and the “T-STAT CALL” and “VALVE OPEN” LEDs will turn off. 24 VAC is dropped to the corresponding zone MOTOR terminals.
- If no other zones are calling for heat the XX contacts will open terminating the demand for heat to the boiler. The 120 VAC is dropped to the SYSTEM PUMP and SEC PUMP.
- If a demand occurs from the DHW aquastat (T-STAT 1), the “T-STAT CALL” and the “VALVE OPEN” LEDs illuminate for zone 1. (When using a pump for zone 1 instead of a zone valve a jumper must be installed on the ZONE 1 END SWITCH terminals.)

- If any other zone was calling for heat (zones 2-6) when zone 1 is calling 24 VAC is dropped to those zone’s MOTOR terminals. The “T-STAT CALL” and “VALVE OPEN” LED will also turn off.
- The XX and the ZONE 1 E/S contacts close to signal a DHW demand to the boiler.
- The ZONE 1 PUMP and SYSTEM PUMP outputs deliver 120 VAC.
- 120 VAC is dropped to the SEC PUMP.
- Once the DHW aquastat (T-STAT 1) is satisfied it will open R to W and 120 VAC to ZONE 1 PUMP and SYSTEM PUMP is dropped. The ZONE 1 E/S and XX contacts open.
- If a call for heat exists from zones 2-6 the corresponding “T-STAT CALL” will illuminate again and 24 VAC will be delivered to their zone MOTOR terminals.
- When the zone valve end switch closes, the “VALVE OPEN” LED illuminates for the corresponding zone. ZVR control sends 120 VAC to SYSTEM PUMP and SEC PUMP outputs. The control will close the XX contacts to signal the boiler of a demand.
- When all the thermostat demands are satisfied R to W will open and the “T-STAT CALL” and “VALVE OPEN” LEDs will turn off. The XX contacts will open terminating the demand for heat to the boiler. The 120 VAC is dropped to the SYSTEM PUMP and SEC PUMP.

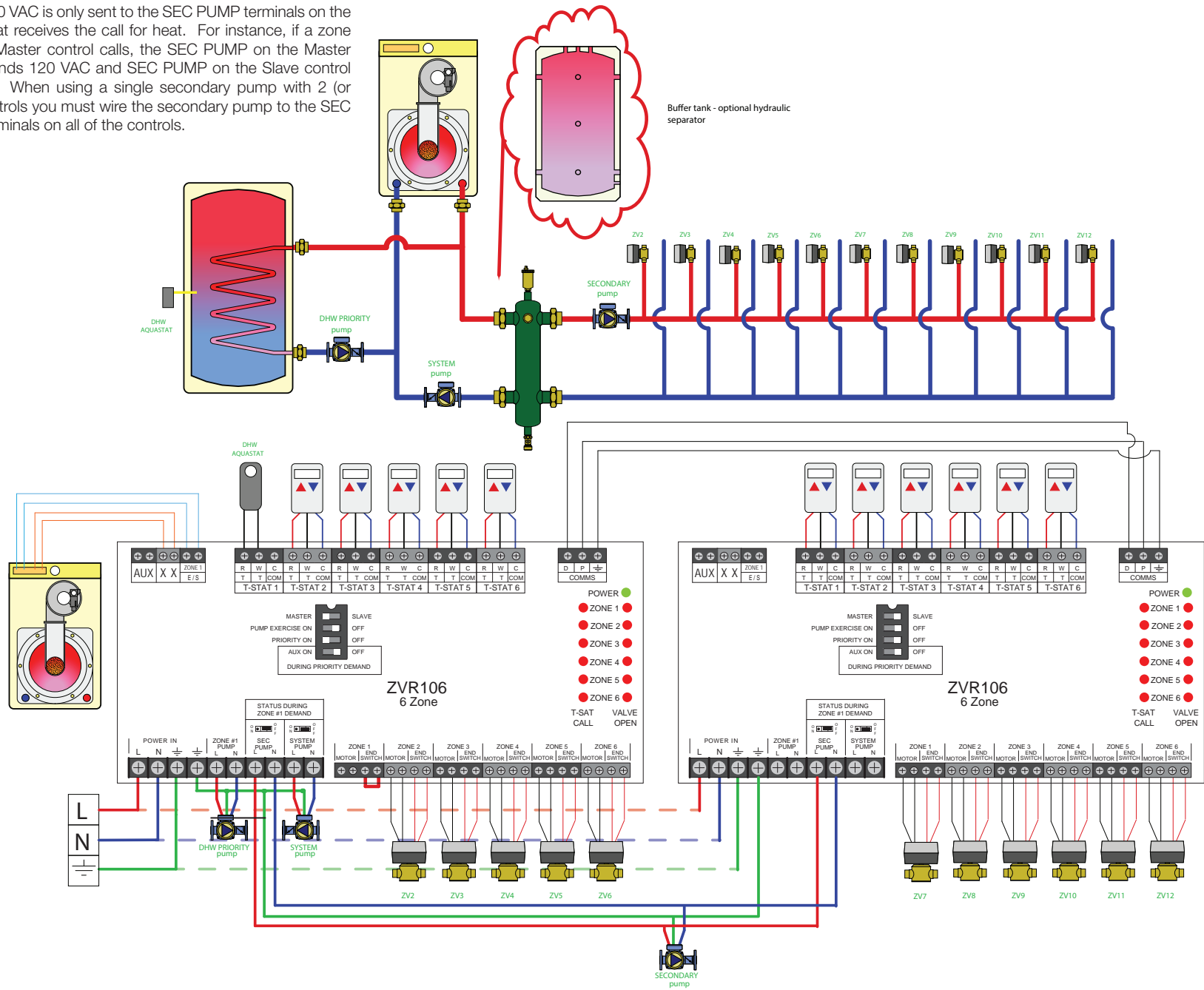
### DHW Time Out \ Freeze Prevention Feature

- After one hour of a priority demand, the control will open the ZONE 1 E/S contacts and drop power to ZONE #1 PUMP and ZONE 1 MOTOR terminals.
- If a call for heat exists from zones 2-6, the control will satisfy those demands before going back to the priority demand.
- After zones 2-6 have been satisfied, the control will go back to the priority demand and reset the one hour timer.



### C4- Mod/Con boiler, priority indirect DHW on primary side of hydro sep, expansion control

NOTE: 120 VAC is only sent to the SEC PUMP terminals on the control that receives the call for heat. For instance, if a zone from the Master control calls, the SEC PUMP on the Master control sends 120 VAC and SEC PUMP on the Slave control does not. When using a single secondary pump with 2 (or more) controls you must wire the secondary pump to the SEC PUMP terminals on all of the controls.



Hydronic diagram is for illustration purposes only, some components have been removed for simplicity.

## Description of terminals

- ⏏ = Ground
- N = Neutral (Common leg of 120 VAC)
- L = Line (Hot leg of 120 VAC)

### Thermostat terminals

- R = 24 VAC
- W = Heat call
- C = Common of 24 VAC

### Boiler terminals

**XX** = Dry contact rated up to 120 VAC, 2 Amps, which is typically connected to TT on boiler control, closes when any zone calls including priority.

**ZONE 1 E/S** = Dry contact rated up to 120 VAC, 2 Amps, will close with any call to ZONE 1. Zone 1 can be enabled as a priority zone, typically used for heating domestic hot water. The ZONE 1 E/S can be used to close a DHW contact on boiler controls equipped with these features.

**AUX** = Dry contact, rated up to 120 VAC, 2 Amps, close when any zone calls and can be used as signal to a variable speed self regulated pump or other controls.

### Pump terminals

**SYSTEM PUMP** = Runs when any zone calls for heat.

**SEC PUMP** = Runs when any zone calls for heat.

**ZONE 1 PUMP** = Runs when zone 1 thermostat calls for heat and zone 1 end switch has closed. A jumper is required between the ZONE 1 END SWITCH terminals when using a pump for ZONE 1 instead of a zone valve.

### STATUS DURING ZONE 1 DEMAND ON / OFF:

When status jumper is placed on ON pins, the secondary and / or system pump will continue to operate during Zone 1 demand. When jumper is placed on OFF pins, the corresponding pump will be OFF during Zone 1 demand.

### Valve terminals

Motor = 24 VAC to power the zone valve motor  
End Switch = Connects to end switch on zone valve. Must be jumped if using a 2-wire zone valve.

## Sequence of Operation / Settings

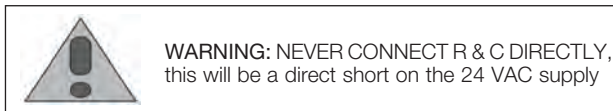
### Control #1

- Master / Slave switch: **Master**
- Pump Exercise: **OFF**
- Priority: **ON**
- AUX During Priority Demand: **OFF**
- Sec Pump Status During Zone 1 Demand Jumper: **OFF**
- System Pump Status During Zone 1 Demand Jumper: **OFF**

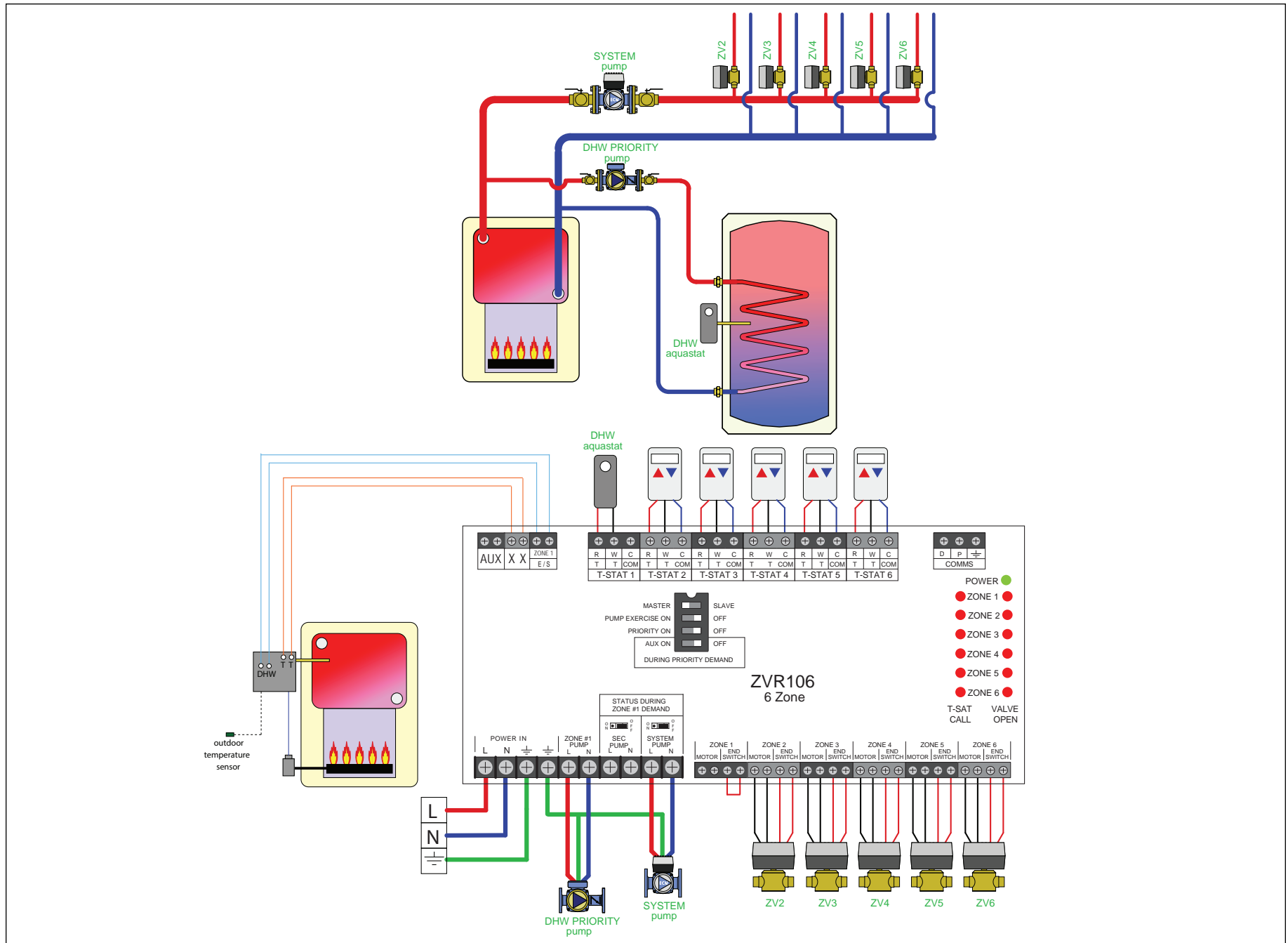
### Control #2

- Master / Slave switch: **Slave**
- Pump Exercise: **OFF**
- Priority: **OFF**
- AUX During Priority Demand: **OFF**
- Sec Pump Status During Zone 1 Demand Jumper: **OFF**
- System Pump Status During Zone 1 Demand Jumper: **OFF**
- A demand occurs from a thermostat on zones 2-12 closing R to W. The “T-STAT CALL” LED illuminates for the corresponding zone.
- ZVR control sends 24 VAC to the corresponding zone MOTOR terminals to open the zone valve.
- When the zone valve end switch closes, the “VALVE OPEN” LED illuminates for the corresponding zone. The Master ZVR control sends 120 VAC to SYSTEM PUMP and the control (Master or Slave) which received the call for heat will send 120 VAC to its SEC PUMP. The Master control will close the XX contacts to signal the boiler of a demand.
- When the thermostat demand is satisfied R to W will open and the “T-STAT CALL” and “VALVE OPEN” LEDs will turn off. 24 VAC is dropped to the corresponding zone MOTOR terminals.

- If no other zones are calling for heat the XX contacts will open terminating the demand for heat to the boiler. The 120 VAC is dropped to the SYSTEM PUMP and SEC PUMP.
- If a demand occurs from the DHW aquastat (T-STAT 1), the “T-STAT CALL” and the “VALVE OPEN” LEDs illuminate for zone 1. (When using a pump for zone 1 instead of a zone valve a jumper must be installed on the ZONE 1 END SWITCH terminals.)
- If any other zone was calling for heat (zones 2-12) when zone 1 is calling 24 VAC is dropped to those zone’s MOTOR terminals. The “T-STAT CALL” and “VALVE OPEN” LED will also turn off.
- The XX and the ZONE 1 E/S contacts on the Master control close to signal a DHW demand to the boiler.
- The ZONE 1 PUMP output on the Master control delivers 120 VAC.
- 120 VAC is dropped to the SYSTEM PUMP and SEC PUMP on all controls.
- Once the DHW aquastat (T-STAT 1) is satisfied it will open R to W and 120 VAC to ZONE 1 PUMP is dropped. The ZONE 1 E/S and XX contacts open.
- If a call for heat exists from zones 2-12 the corresponding “T-STAT CALL” will illuminate again and 24 VAC will be delivered to their zone MOTOR terminals.
- When the zone valve end switch closes, the “VALVE OPEN” LED illuminates for the corresponding zone. ZVR control #1 sends 120 VAC to SYSTEM PUMP and the corresponding control SEC PUMP outputs. The Master control will close the XX contacts to signal the boiler of a demand.
- When all the thermostat demands are satisfied R to W will open and the “T-STAT CALL” and “VALVE OPEN” LEDs will turn off. The XX contacts will open terminating the demand for heat to the boiler. The 120 VAC is dropped to the SYSTEM PUMP and SEC PUMP on all controls.



# C5 - Traditional boiler, indirect DHW (no priority) with pump, zone valves



Hydronic diagram is for illustration purposes only, some components have been removed for simplicity.

## Description of terminals

- ⏏ = Ground
- N = Neutral (Common leg of 120 VAC)
- L = Line (Hot leg of 120 VAC)

### Thermostat terminals

- R = 24 VAC
- W = Heat call
- C = Common of 24 VAC

### Boiler terminals

**XX** = Dry contact rated up to 120 VAC, 2 Amps, which is typically connected to TT on boiler control, closes when any zone calls including priority.

**ZONE 1 E/S** = Dry contact rated up to 120 VAC, 2 Amps, will close with any call to ZONE 1. Zone 1 can be enabled as a priority zone, typically used for heating domestic hot water. The ZONE 1 E/S can be used to close a DHW contact on boiler controls equipped with these features.

**AUX** = Dry contact, rated up to 120 VAC, 2 Amps, close when any zone calls and can be used as signal to a variable speed self regulated pump or other controls.

### Pump terminals

**SYSTEM PUMP** = Runs when any zone calls for heat.

**SEC PUMP** = Runs when any zone calls for heat.

**ZONE 1 PUMP** = Runs when zone 1 thermostat calls for heat and zone 1 end switch has closed. A jumper is required between the ZONE 1 END SWITCH terminals when using a pump for ZONE 1 instead of a zone valve.

### STATUS DURING ZONE 1 DEMAND ON / OFF:

When status jumper is placed on ON pins, the secondary and / or system pump will continue to operate during Zone 1 demand. When jumper is placed on OFF pins, the corresponding pump will be OFF during Zone 1 demand.

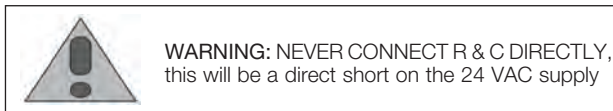
### Valve terminals

Motor = 24 VAC to power the zone valve motor  
End Switch = Connects to end switch on zone valve. Must be jumped if using a 2-wire zone valve.

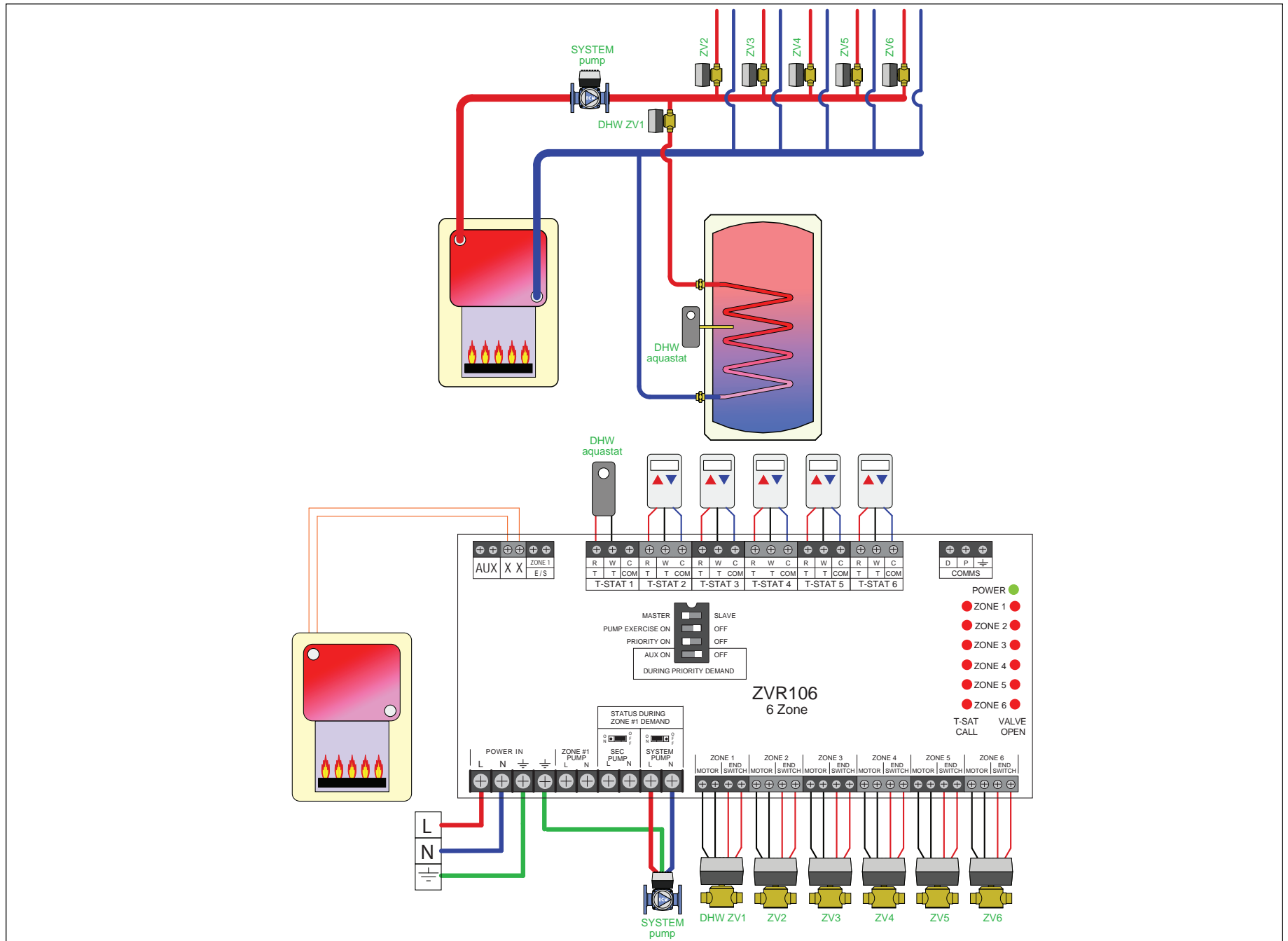
## Sequence of Operation / Settings

- Master / Slave switch: **Master**
- Pump Exercise: **OFF**
- Priority: **OFF**
- AUX During Priority Demand: **OFF**
- Sec Pump Status During Zone 1 Demand Jumper: **OFF**
- System Pump Status During Zone 1 Demand Jumper: **OFF**
- Sec Pump Status During Zone 1 Demand Jumper: **OFF**
- A demand occurs from a thermostat on zones 2-6 closing R to W. The “T-STAT CALL” LED illuminates for the corresponding zone.
- ZVR control sends 24 VAC to the corresponding zone MOTOR terminals to open the zone valve.
- When the zone valve end switch closes, the “VALVE OPEN” LED illuminates for the corresponding zone. ZVR control sends 120 VAC to SYSTEM PUMP output. The control will close the XX contacts to signal the boiler of a demand.
- If a demand occurs from the DHW aquastat (T-STAT 1), the “T-STAT CALL” LED and the “VALVE OPEN” LED will illuminate for zone 1. (When using a pump for zone 1 instead of a zone valve a jumper must be installed on the ZONE 1 END SWITCH terminals.) ZVR control sends 120 VAC to the ZONE #1 PUMP. The XX and ZONE 1 E/S contacts close to signal a DHW demand to the boiler.

- **NOTE:** At this point, the control has signaled the boiler of a DHW demand which (in most cases) will override any outdoor reset controls and raise the temperature of the boiler. Because priority is not enabled on the control, you will now be allowing high temperature fluid to zones 2-6. Be certain that these zones are capable of handling this high temperature fluid. If not, priority will need to be enabled to hold off zones 2-6 during a demand from the DHW aquastat.
- When the thermostat demands from zones 2-6 are satisfied R to W will open and the “T-STAT CALL” and “VALVE OPEN” LEDs will turn off. 24 VAC is dropped to the corresponding zone MOTOR terminals.
- If the DHW aquastat (T-STAT 1) is still calling for heat the XX and ZONE 1 E/S contacts will remain closed and the ZONE #1 PUMP will remain powered. 120 VAC will be dropped to the SYSTEM PUMP. (This is due to the jumper position of the SYSTEM PUMP for STATUS DURING ZONE #1 DEMAND.)
- When all the thermostat demands are satisfied R to W will open and the “T-STAT CALL” and “VALVE OPEN” LEDs will turn off. The XX and ZONE 1 E/S contacts will open terminating any demands to the boiler. The 120 VAC is dropped to all of the pump outputs (SYSTEM PUMP and ZONE #1 PUMP).



# C6- Traditional boiler with priority indirect DHW with valve, zone valves



Hydronic diagram is for illustration purposes only, some components have been removed for simplicity.



## Description of terminals

- ≡ = Ground
- N = Neutral (Common leg of 120 VAC)
- L = Line (Hot leg of 120 VAC)

### Thermostat terminals

- R = 24 VAC
- W = Heat call
- C = Common of 24 VAC

### Boiler terminals

**XX** = Dry contact rated up to 120 VAC, 2 Amps, which is typically connected to TT on boiler control, closes when any zone calls including priority.

**ZONE 1 E/S** = Dry contact rated up to 120 VAC, 2 Amps, will close with any call to ZONE 1. Zone 1 can be enabled as a priority zone, typically used for heating domestic hot water. The ZONE 1 E/S can be used to close a DHW contact on boiler controls equipped with these features.

**AUX** = Dry contact, rated up to 120 VAC, 2 Amps, close when any zone calls and can be used as signal to a variable speed self regulated pump or other controls.

### Pump terminals

**SYSTEM PUMP** = Runs when any zone calls for heat.

**SEC PUMP** = Runs when any zone calls for heat.

**ZONE 1 PUMP** = Runs when zone 1 thermostat calls for heat and zone 1 end switch has closed. A jumper is required between the ZONE 1 END SWITCH terminals when using a pump for ZONE 1 instead of a zone valve.

**STATUS DURING ZONE 1 DEMAND ON / OFF:** When status jumper is placed on ON pins, the secondary and / or system pump will continue to operate during Zone 1 demand. When jumper is placed on OFF pins, the corresponding pump will be OFF during Zone 1 demand.

### Valve terminals

Motor = 24 VAC to power the zone valve motor  
End Switch = Connects to end switch on zone valve. Must be jumped if using a 2-wire zone valve.

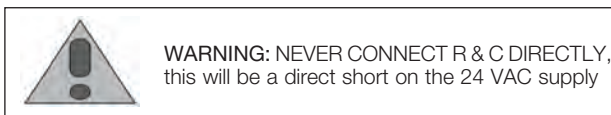
## Sequence of Operation

- Master / Slave switch: **Master**
- Pump Exercise: **OFF**
- Priority: **ON**
- AUX During Priority Demand: **OFF**
- Sec Pump Status During Zone 1 Demand Jumper: **OFF**
- System Pump Status During Zone 1 Demand Jumper: **ON**
- A demand occurs from a thermostat on zones 2-6 closing R to W. The “T-STAT CALL” LED illuminates for the corresponding zone.
- ZVR control sends 24 VAC to the corresponding zone MOTOR terminals to open the zone valve.
- When the zone valve end switch closes, the “VALVE OPEN” LED illuminates for the corresponding zone. ZVR control sends 120 VAC to SYSTEM PUMP output. The control will close the XX contacts to signal the boiler of a demand.
- When the thermostat demand is satisfied R to W will open and the “T-STAT CALL” and “VALVE OPEN” LEDs will turn off. 24 VAC is dropped to the corresponding zone MOTOR terminals.
- If no other zones are calling for heat the XX contacts will open terminating the demand for heat to the boiler. The 120 VAC is dropped to the SYSTEM PUMP.
- If a demand occurs from the DHW aquastat (T-STAT 1), the “T-STAT CALL” LED illuminates for zone 1.
- ZVR control sends 24 VAC to ZONE 1 MOTOR terminals.

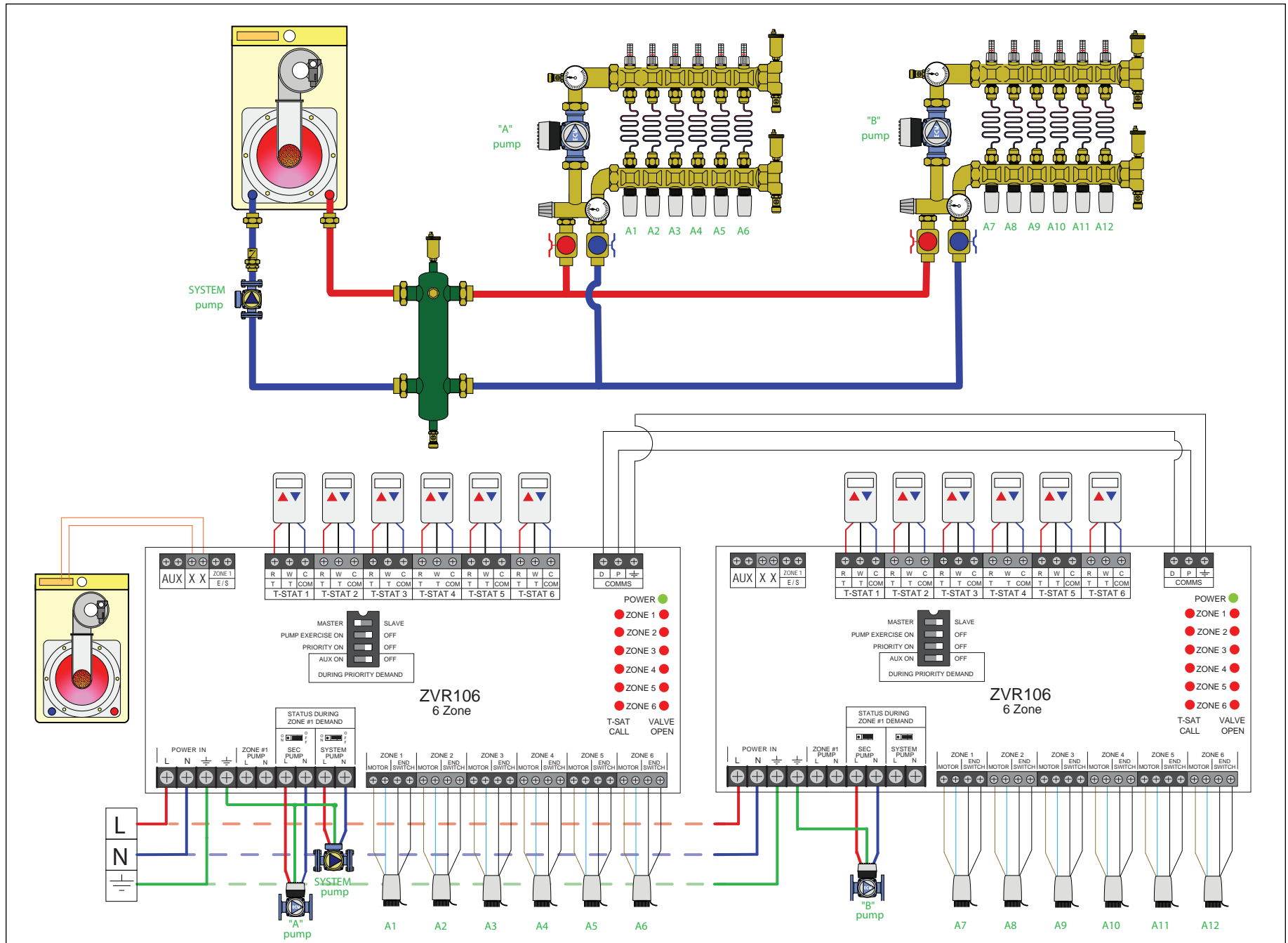
- When the ZONE 1 zone valve end switch closes, the “VALVE OPEN” LED illuminates for ZONE 1.
- If any other zone was calling for heat (zones 2-6) when zone 1 is calling 24 VAC is dropped to those zone’s MOTOR terminals. The “T-STAT CALL” and “VALVE OPEN” LED will also turn off.
- The XX contacts close to signal a demand to the boiler.
- The SYSTEM PUMP output delivers 120 VAC.
- Once the DHW aquastat (T-STAT 1) is satisfied it will open R to W and 120 VAC to the SYSTEM PUMP is dropped. The XX contacts open.
- If a call for heat exists from zones 2-6 the corresponding “T-STAT CALL” will illuminate again and 24 VAC will be delivered to their zone MOTOR terminals.
- When the zone valve end switch closes, the “VALVE OPEN” LED illuminates for the corresponding zone. ZVR control sends 120 VAC to SYSTEM PUMP and SEC PUMP outputs. The control will close the XX contacts to signal the boiler of a demand.
- When all the thermostat demands are satisfied R to W will open and the “T-STAT CALL” and “VALVE OPEN” LEDs will turn off. The XX contacts will open terminating the demand for heat to the boiler. The 120 VAC is dropped to the SYSTEM PUMP and SEC PUMP.

### DHW Time Out \ Freeze Prevention Feature

- After one hour of a priority demand, the control will drop power to the ZONE 1 MOTOR terminals.
- If a call for heat exists from zones 2-6, the control will satisfy those demands before going back to the priority demand.
- After zones 2-6 have been satisfied, the control will go back to the priority demand and reset the one hour timer.



# C7 - Mod/Con boiler, hydro separator, zone valves (more than 6), multiple secondary pumps



Hydronic diagram is for illustration purposes only, some components have been removed for simplicity.

## Description of terminals

- ≡ = Ground
- N = Neutral (Common leg of 120 VAC)
- L = Line (Hot leg of 120 VAC)

### Thermostat terminals

- R = 24 VAC
- W = Heat call
- C = Common of 24 VAC

### Boiler terminals

**XX** = Dry contact rated up to 120 VAC, 2 Amps, which is typically connected to TT on boiler control, closes when any zone calls including priority.

**ZONE 1 E/S** = Dry contact rated up to 120 VAC, 2 Amps, will close with any call to ZONE 1. Zone 1 can be enabled as a priority zone, typically used for heating domestic hot water. The ZONE 1 E/S can be used to close a DHW contact on boiler controls equipped with these features.

**AUX** = Dry contact, rated up to 120 VAC, 2 Amps, close when any zone calls and can be used as signal to a variable speed self regulated pump or other controls.

### Pump terminals

**SYSTEM PUMP** = Runs when any zone calls for heat.

**SEC PUMP** = Runs when any zone calls for heat.

**ZONE 1 PUMP** = Runs when zone 1 thermostat calls for heat and zone 1 end switch has closed. A jumper is required between the ZONE 1 END SWITCH terminals when using a pump for ZONE 1 instead of a zone valve.

### STATUS DURING ZONE 1 DEMAND ON / OFF:

When status jumper is placed on ON pins, the secondary and / or system pump will continue to operate during Zone 1 demand. When jumper is placed on OFF pins, the corresponding pump will be OFF during Zone 1 demand.

### Valve terminals

Motor = 24 VAC to power the zone valve motor  
End Switch = Connects to end switch on zone valve. Must be jumped if using a 2-wire zone valve.

## Sequence of Operation / Settings

### Control #1

- Master / Slave switch: **Master**
- Pump Exercise: **OFF**
- Priority: **OFF**
- AUX During Priority Demand: **OFF**
- Sec Pump Status During Zone 1 Demand Jumper: **OFF**
- System Pump Status During Zone 1 Demand Jumper: **OFF**

### Control #2

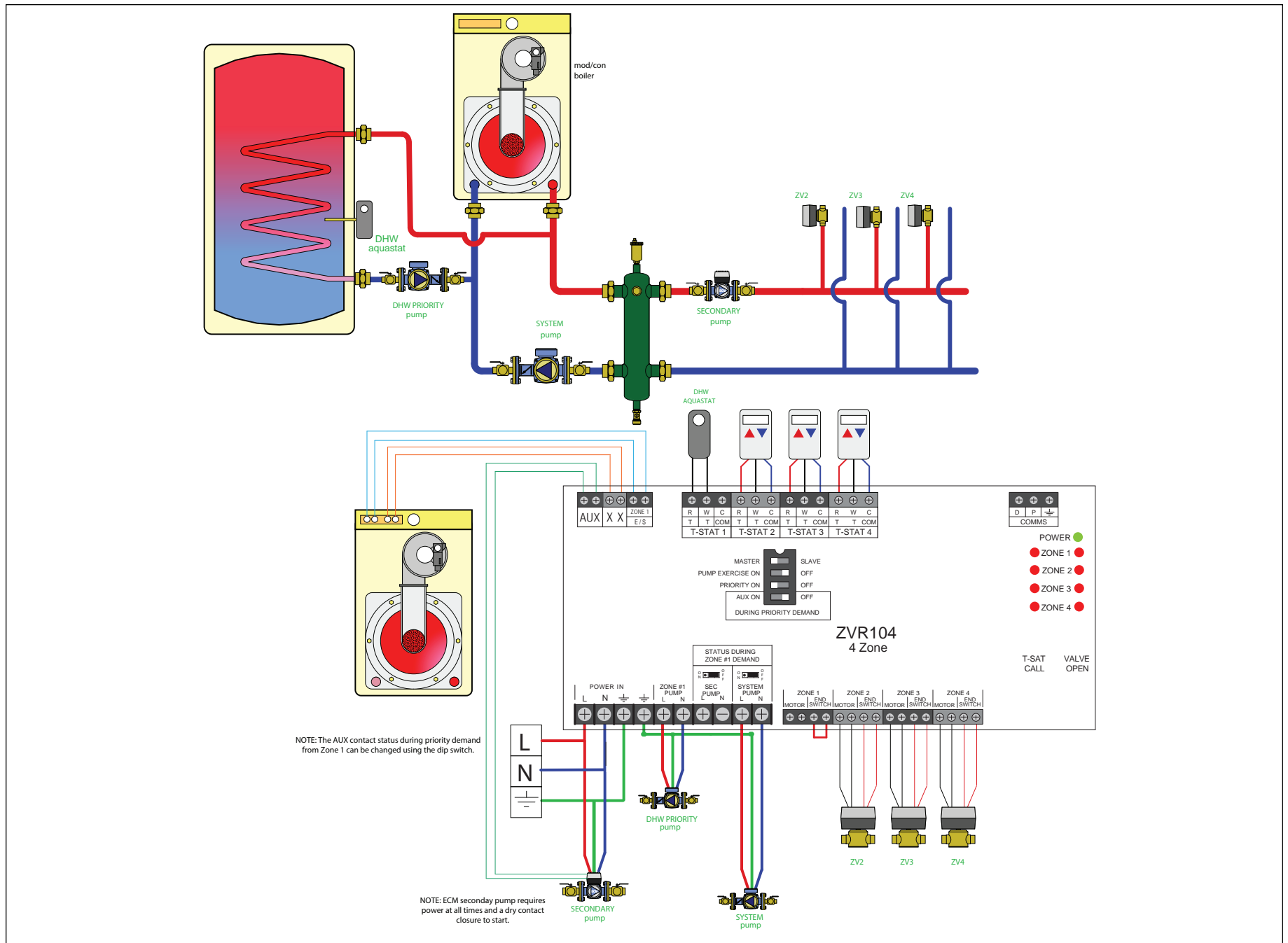
- Master / Slave switch: **Slave**
- Pump Exercise: **OFF**
- Priority: **OFF**
- AUX During Priority Demand: **OFF**
- Sec Pump Status During Zone 1 Demand Jumper: **OFF**
- System Pump Status During Zone 1 Demand Jumper: **OFF**
- A demand occurs from a thermostat on zones 1-12 closing R to W. The “T-STAT CALL” LED illuminates for the corresponding zone.
- ZVR control sends 24 VAC to the corresponding zone MOTOR terminals to open the zone valve.
- When the zone valve end switch closes, the “VALVE OPEN” LED illuminates for the corresponding zone. The Master ZVR control sends 120 VAC to SYSTEM PUMP and the control (Master or Slave) which received the call for heat will send 120 VAC to its SEC PUMP. The Master control will close the XX contacts to signal the boiler of a demand.

- **NOTE:** 120 VAC is only sent to the SEC PUMP terminals on the control that receives the call for heat. For instance, if a zone from the Master control calls, the SEC PUMP on the Master control sends 120 VAC and SEC PUMP on the Slave control does not.
- When the thermostat demand is satisfied R to W will open and the “T-STAT CALL” and “VALVE OPEN” LEDs will turn off. 24 VAC is dropped to the corresponding zone MOTOR terminals.
- If no other zones are calling for heat the XX contacts will open terminating the demand for heat to the boiler. The 120 VAC is dropped to the SYSTEM PUMP and SEC PUMP.



**WARNING:** NEVER CONNECT R & C DIRECTLY, this will be a direct short on the 24 VAC supply

# C8 - Mod/Con boiler, indirect DHW on primary side of hydro sep, zone valves, ECM pump enable



Hydronic diagram is for illustration purposes only, some components have been removed for simplicity.

## Description of terminals

- ⊕ = Ground
- N = Neutral (Common leg of 120 VAC)
- L = Line (Hot leg of 120 VAC)

### Thermostat terminals

- R = 24 VAC
- W = Heat call
- C = Common of 24 VAC

### Boiler terminals

**XX** = Dry contact rated up to 120 VAC, 2 Amps, which is typically connected to TT on boiler control, closes when any zone calls including priority.

**ZONE 1 E/S** = Dry contact rated up to 120 VAC, 2 Amps, will close with any call to ZONE 1. Zone 1 can be enabled as a priority zone, typically used for heating domestic hot water. The ZONE 1 E/S can be used to close a DHW contact on boiler controls equipped with these features.

**AUX** = Dry contact, rated up to 120 VAC, 2 Amps, close when any zone calls and can be used as signal to a variable speed self regulated pump or other controls.

### Pump terminals

**SYSTEM PUMP** = Runs when any zone calls for heat.

**SEC PUMP** = Runs when any zone calls for heat.

**ZONE 1 PUMP** = Runs when zone 1 thermostat calls for heat and zone 1 end switch has closed. A jumper is required between the ZONE 1 END SWITCH terminals when using a pump for ZONE 1 instead of a zone valve.

### STATUS DURING ZONE 1 DEMAND ON / OFF:

When status jumper is placed on ON pins, the secondary and / or system pump will continue to operate during Zone 1 demand. When jumper is placed on OFF pins, the corresponding pump will be OFF during Zone 1 demand.

### Valve terminals

Motor = 24 VAC to power the zone valve motor  
End Switch = Connects to end switch on zone valve. Must be jumped if using a 2-wire zone valve.

## Sequence of Operation / Settings

- Master / Slave switch: **Master**
- Pump Exercise: **OFF**
- Priority: **ON**
- AUX During Priority Demand: **OFF**
- System Pump Status During Zone 1 Demand Jumper: **OFF**
- Sec Pump Status During Zone 1 Demand Jumper: **OFF**
- A demand occurs from a thermostat on zones 2-6 closing R to W. The “T-STAT CALL” LED illuminates for the corresponding zone.
- ZVR control sends 24 VAC to the corresponding zone MOTOR terminals to open the zone valve.
- When the zone valve end switch closes, the “VALVE OPEN” LED illuminates for the corresponding zone. ZVR control sends 120 VAC to SYSTEM PUMP output. The control will close the XX contacts to signal the boiler of a demand and close the AUX contacts to signal the ECM pump to start.
- When the thermostat demand is satisfied R to W will open and the “T-STAT CALL” and “VALVE OPEN” LEDs will turn off. 24 VAC is dropped to the corresponding zone MOTOR terminals.
- If no other zones are calling for heat the XX contacts will open terminating the demand for heat to the boiler. The AUX contacts will also open terminating the demand to the ECM pump. The 120 VAC is dropped to the SYSTEM PUMP.
- If a demand occurs from the DHW aquastat (T-STAT 1), the “T-STAT CALL” and the “VALVE OPEN” LEDs illuminate for zone 1. (When using a pump for zone 1 instead of a zone valve a jumper must be installed on the ZONE 1 END SWITCH terminals.)
- If any other zone was calling for heat (zones



**WARNING:** NEVER CONNECT R & C DIRECTLY, this will be a direct short on the 24 VAC supply

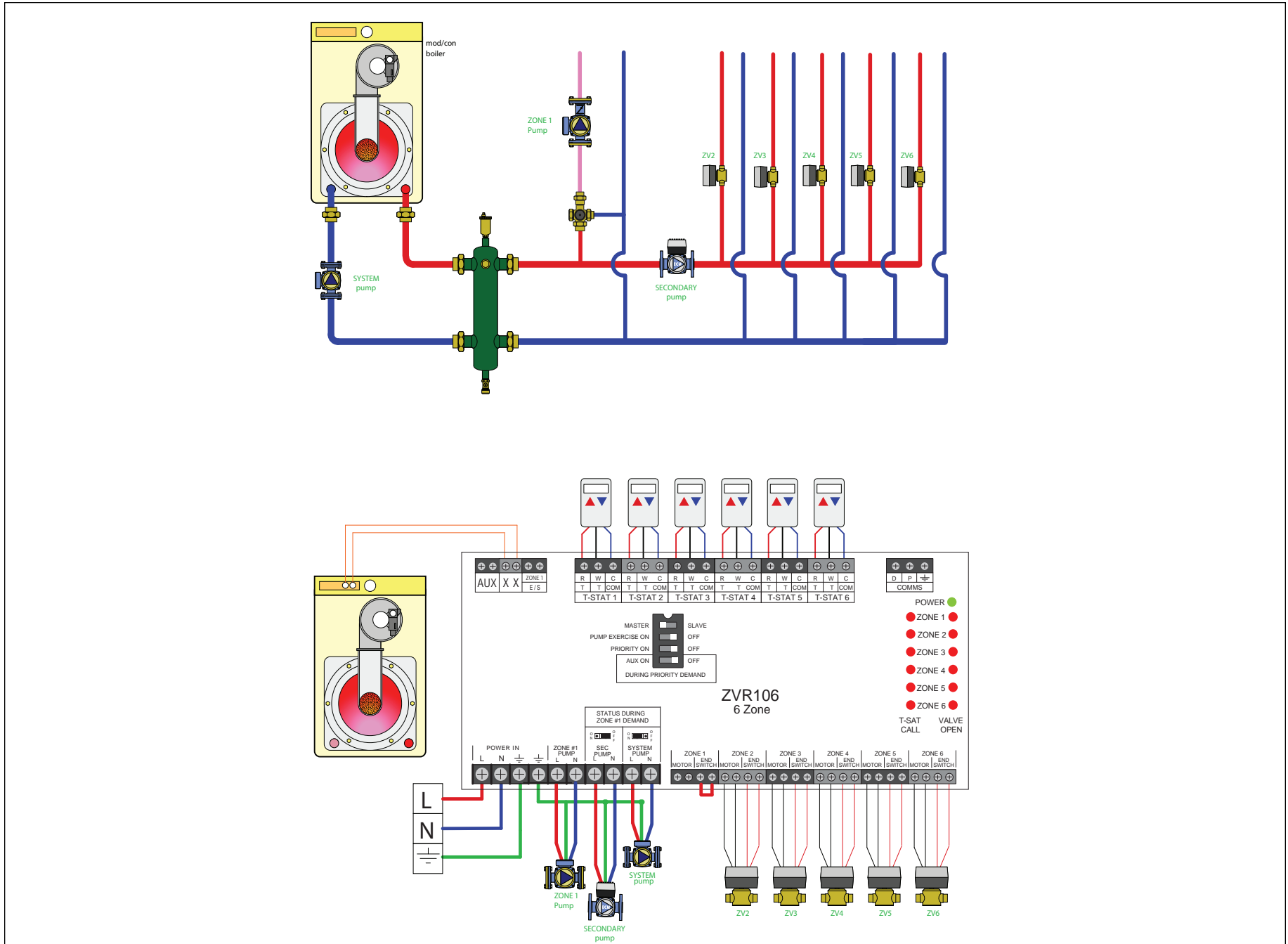
2-6) when zone 1 is calling 24 VAC is dropped to those zone's MOTOR terminals. The “T-STAT CALL” and “VALVE OPEN” LED will also turn off. The AUX contacts will also open terminating the demand to the ECM pump.

- The XX and the ZONE 1 E/S contacts close to signal a DHW demand to the boiler.
- The ZONE 1 PUMP output delivers 120 VAC.
- 120 VAC is dropped to the SYSTEM PUMP.
- Once the DHW aquastat (T-STAT 1) is satisfied it will open R to W and 120 VAC to ZONE 1 PUMP is dropped. The ZONE 1 E/S and XX contacts open.
- If a call for heat exists from zones 2-6 the corresponding “T-STAT CALL” LED will illuminate again and 24 VAC will be delivered to their zone MOTOR terminals.
- When the zone valve end switch closes, the “VALVE OPEN” LED illuminates for the corresponding zone. ZVR control sends 120 VAC to SYSTEM PUMP output. The control will close the XX contacts to signal the boiler of a demand and close the AUX contacts to signal the ECM pump to start.
- When all the thermostat demands are satisfied R to W will open and the “T-STAT CALL” and “VALVE OPEN” LEDs will turn off. The XX contacts will open terminating the demand for heat to the boiler. The AUX contacts will also open terminating the demand to the ECM pump. The 120 VAC is dropped to the SYSTEM PUMP.

### DHW Time Out \ Freeze Prevention Feature

- After one hour of a priority demand, the control will open the ZONE 1 E/S contacts and drop power to ZONE #1 PUMP and ZONE 1 MOTOR terminals.
- If a call for heat exists from zones 2-6, the control will satisfy those demands before going back to the priority demand.
- After zones 2-6 have been satisfied, the control will go back to the priority demand and reset the one hour timer.

# C9 - Mod/Con boiler, hydro separator, Zone 1 low temp pump, zones 2 - 6 high temp zone valves



Hydronic diagram is for illustration purposes only, some components have been removed for simplicity.

## Description of terminals

- ⏏ = Ground
- N = Neutral (Common leg of 120 VAC)
- L = Line (Hot leg of 120 VAC)

### Thermostat terminals

- R = 24 VAC
- W = Heat call
- C = Common of 24 VAC

### Boiler terminals

**XX** = Dry contact rated up to 120 VAC, 2 Amps, which is typically connected to TT on boiler control, closes when any zone calls including priority.

**ZONE 1 E/S** = Dry contact rated up to 120 VAC, 2 Amps, will close with any call to ZONE 1. Zone 1 can be enabled as a priority zone, typically used for heating domestic hot water. The ZONE 1 E/S can be used to close a DHW contact on boiler controls equipped with these features.

**AUX** = Dry contact, rated up to 120 VAC, 2 Amps, close when any zone calls and can be used as signal to a variable speed self regulated pump or other controls.

### Pump terminals

**SYSTEM PUMP** = Runs when any zone calls for heat.

**SEC PUMP** = Runs when any zone calls for heat.

**ZONE 1 PUMP** = Runs when zone 1 thermostat calls for heat and zone 1 end switch has closed. A jumper is required between the ZONE 1 END SWITCH terminals when using a pump for ZONE 1 instead of a zone valve.

### STATUS DURING ZONE 1 DEMAND ON / OFF:

When status jumper is placed on ON pins, the secondary and / or system pump will continue to operate during Zone 1 demand. When jumper is placed on OFF pins, the corresponding pump will be OFF during Zone 1 demand.

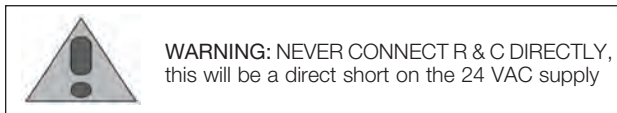
### Valve terminals

Motor = 24 VAC to power the zone valve motor  
End Switch = Connects to end switch on zone valve. Must be jumped if using a 2-wire zone valve.

## Sequence of Operation / Settings

- Master / Slave switch: **Master**
- Pump Exercise: **OFF**
- Priority: **OFF**
- AUX During Priority Demand: **OFF**
- Sec Pump Status During Zone 1 Demand Jumper: **OFF**
- System Pump Status During Zone 1 Demand Jumper: **ON**
- A demand occurs from a thermostat on zones 2-6 closing R to W. The “T-STAT CALL” LED illuminates for the corresponding zone.
- ZVR control sends 24 VAC to the corresponding zone MOTOR terminals to open the zone valve.
- When the zone valve end switch closes, the “VALVE OPEN” LED illuminates for the corresponding zone. ZVR control sends 120 VAC to SYSTEM PUMP and SEC PUMP outputs. The control will close the XX contacts to signal the boiler of a demand.
- If a demand occurs from the thermostat on zone 1 closing R to W. The “T-STAT CALL” LED and the “VALVE OPEN” LED will illuminate. (When using a pump for zone 1 instead of a zone valve a jumper must be installed on the ZONE 1 END SWITCH terminals.) ZVR control sends 120 VAC to the ZONE #1 PUMP.
- When the thermostat demands from zones 2-6 are satisfied R to W will open and the “T-STAT CALL” and “VALVE OPEN” LEDs will turn off. 24 VAC is dropped to the corresponding zone MOTOR terminals.

- If zone 1 thermostat is still calling for heat the XX contacts will remain closed and the SYSTEM PUMP and the ZONE #1 PUMP will remain powered. 120 VAC will be dropped to the SEC PUMP. (This is due to the jumper position of the SEC PUMP for STATUS DURING ZONE #1 DEMAND.)
- When all the thermostat demands are satisfied R to W will open and the “T-STAT CALL” and “VALVE OPEN” LEDs will turn off. The XX contacts will open terminating the demand for heat to the boiler. The 120 VAC is dropped to all of the PUMP outputs (SYSTEM PUMP, SEC PUMP and ZONE #1 PUMP).





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