

# The All New . . .

## TACO ZONE CONTROLS WIRING GUIDE

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**Do it once.  
Do it right.**





# TACO Zone Control Product Information

## Switching Relays

*Product No.*

**SR501-4**  
**SR501-HC-4**  
**SR501-OR-4**  
**SR502-4**  
**SR503-4**  
**SR504-4**  
**SR506-4**

*Description*

**1 Zone Switching Relay**  
**1 or 2 Zone Switching Relay, High Current Capacity**  
**1 Zone Switching Relay with Outdoor Reset**  
**2 Zone Switching Relay with Priority**  
**3 Zone Switching Relay with Priority**  
**4 Zone Switching Relay with Priority**  
**6 Zone Switching Relay with Priority**

## Expandable Switching Relays – Expandable to 120 Zones (20 Zoning Panels)

*Product No.*

**SR501-EXP-4**  
**SR503-EXP-4**  
**SR504-EXP-4**  
**SR506-EXP-4**

*Description*

**1 Zone Switching Relay**  
**3 Zone Switching Relay with Priority**  
**4 Zone Switching Relay with Priority**  
**6 Zone Switching Relay with Priority**

## Zone Valve Controls

*Product No.*

**ZVC403-4**  
**ZVC404-4**  
**ZVC405-4**  
**ZVC406-4**

*Description*

**3 Zone Valve Control with Priority**  
**4 Zone Valve Control with Priority**  
**5 Zone Valve Control with Priority**  
**6 Zone Valve Control with Priority**

## Expandable Zone Valve Controls – Expandable to 120 Zones (20 Zoning Panels)

*Product No.*

**ZVC404-EXP-4**  
**ZVC406-EXP-4**

*Description*

**4 Zone Valve Control with Priority**  
**6 Zone Valve Control with Priority**

## Add-On Power Controls *(For use with all -EXP controls)*

*Product No.*

**PC700**  
**PC702**  
**PC705**

*Description*

**Boiler Reset Control**  
**2-Stage Boiler Reset Control**  
**Variable Speed Pump Injection Mixing Control**

## Fan Controls

*Product No.*

**HAFC101-4**  
**HAFC201-4**

*Description*

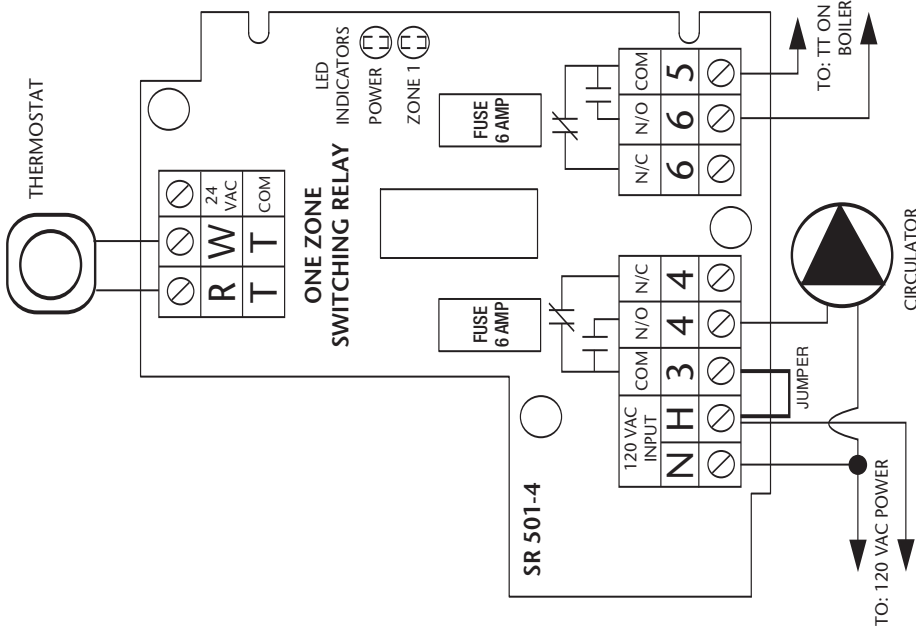
**Hydro Air Fan Control**  
**Hydro Air Fan Control with Optional Time Delays**

**Do it once.**  
**Do it right.**

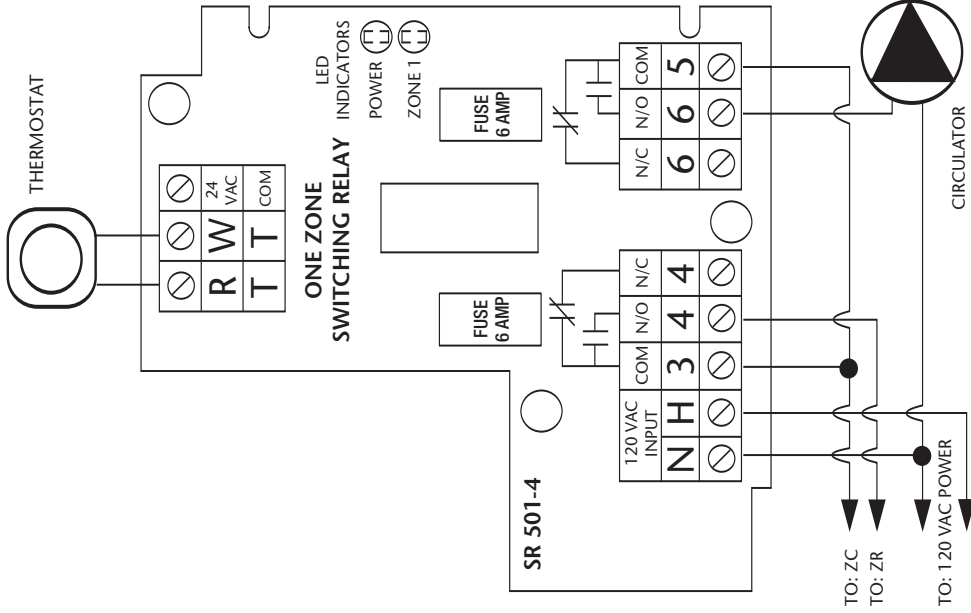


# SR501-4 Switching Relay Wiring

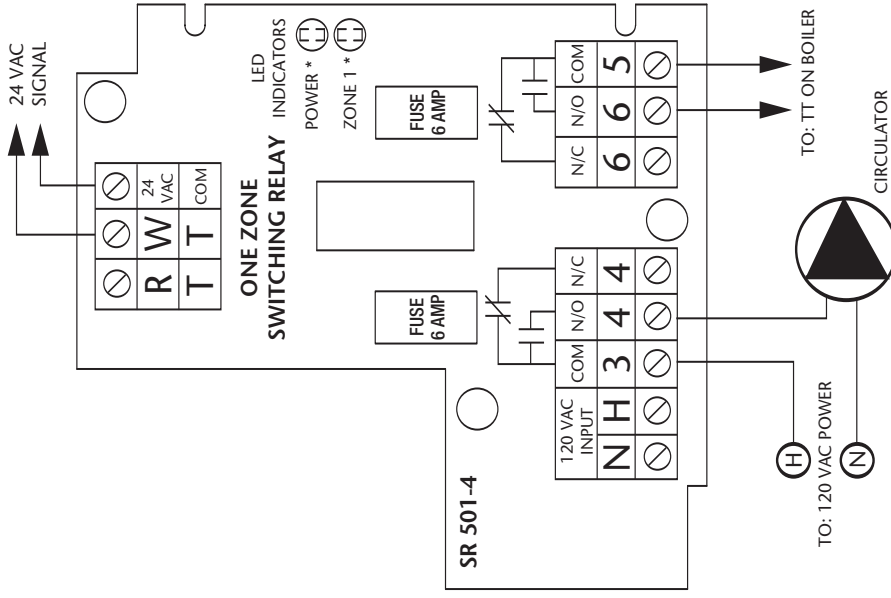
**TYPICAL WIRING  
(COLD START)**



**ALTERNATIVE WIRING  
(TANKLESS COIL)**



**ALTERNATIVE WIRING  
(24 VAC POWERED INPUT SIGNAL)**



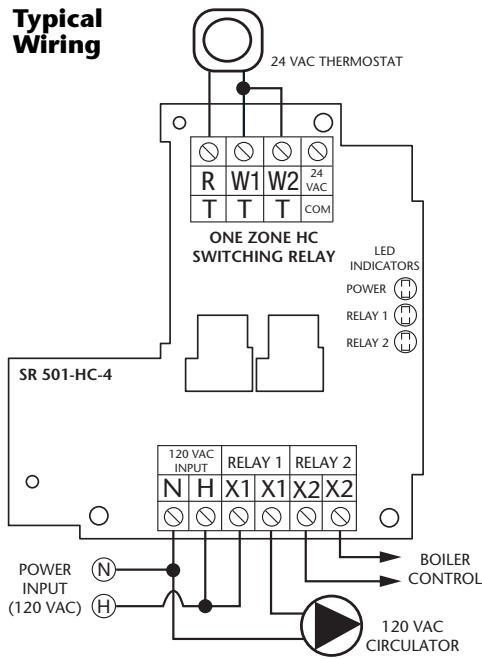
REMOVE JUMPER.  
DO NOT CONNECT POWER  
TO N AND H TERMINALS.

\* T STAT LIGHT WILL GO  
ON AND OFF WITH 24 VAC  
SIGNAL. POWER LIGHT  
WILL ALWAYS BE OFF.

**Note:** When using Alternative Wiring diagram, the boiler operating control's ZC terminal will see the load of the circulator(s).  
**Warning:** When using Alternative Wiring diagram, wiring instructions must be followed so power originates from the boiler aquastat. Failure to follow these wiring instructions may result in a secondary source of power being connected to the boiler that may activate it under certain circumstances, causing injury or death.

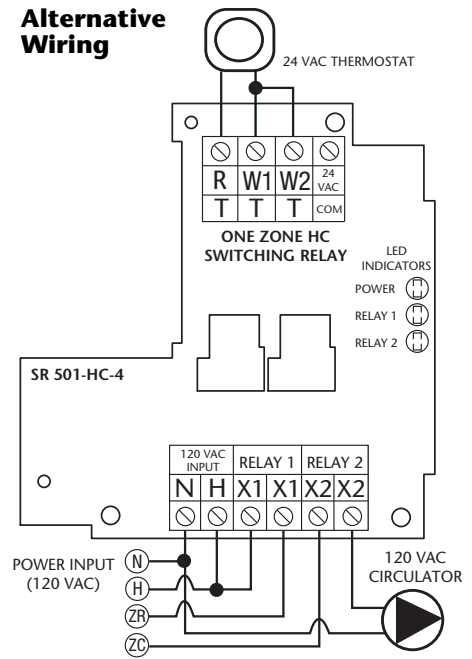
# SR501-HC-4 - One Zone Switching Relay with or without Boiler Enable

## Typical Wiring

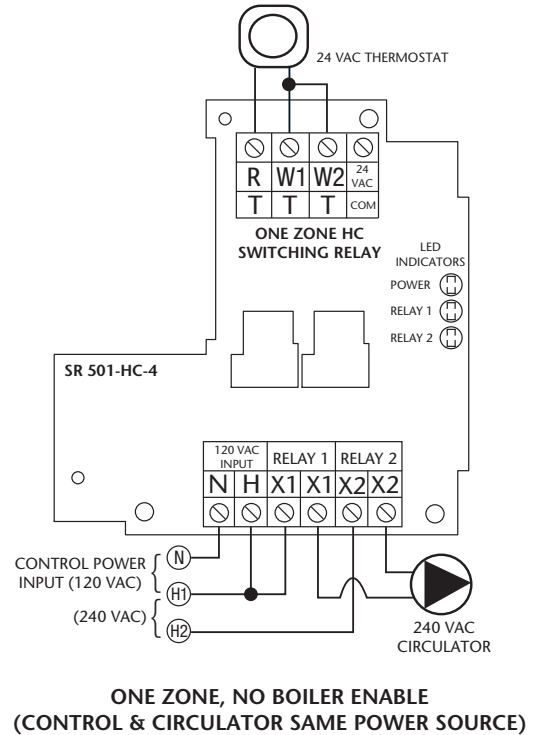
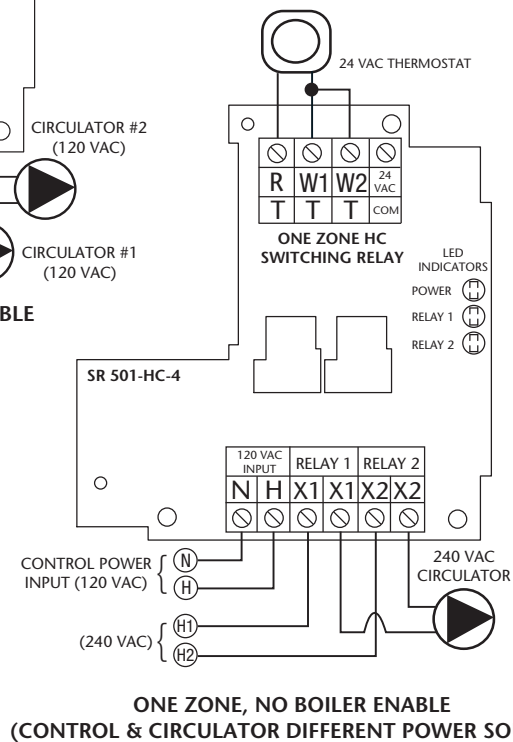
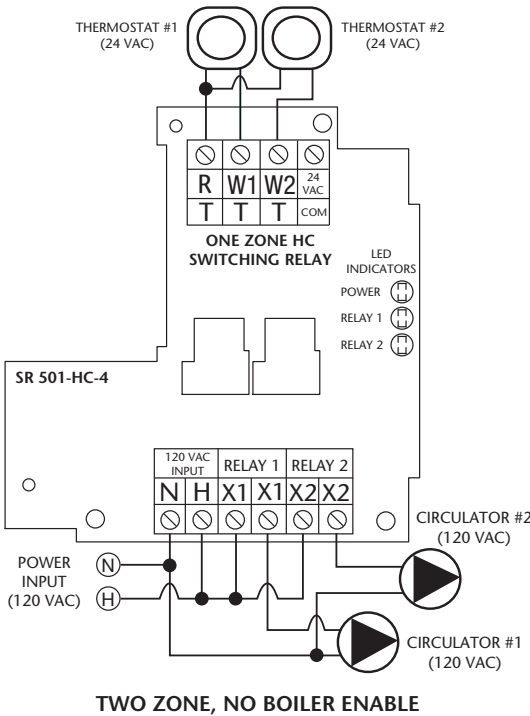


**RELAY RATING:** 1/3 HP (13.8 FLA, 82.8 LRA at 120 VAC)  
(6.9 FLA, 41.4 LRA at 240 VAC)

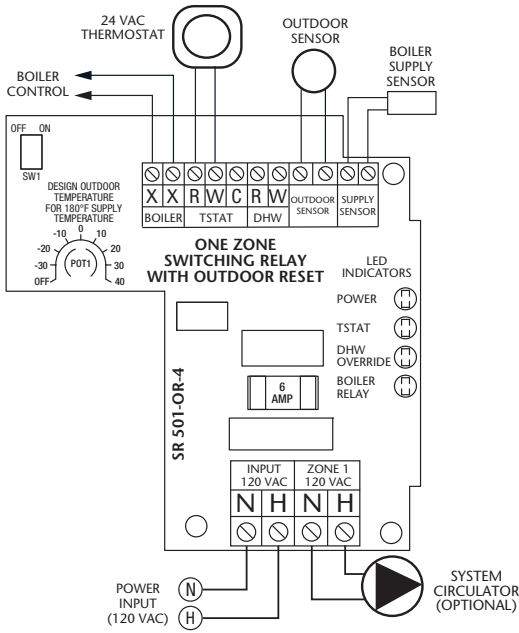
## Alternative Wiring



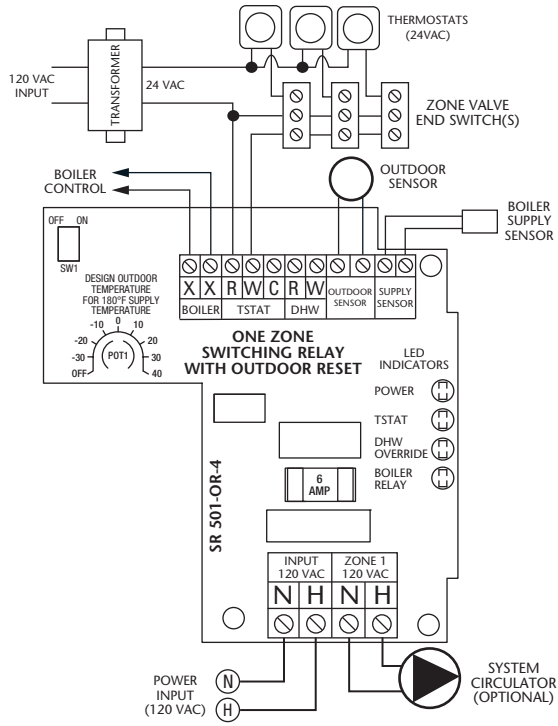
**NOTE:** When using Alternative Wiring diagram, refer to important NOTE and WARNING in SR501-HC Instruction Sheet on page 91 of this booklet.



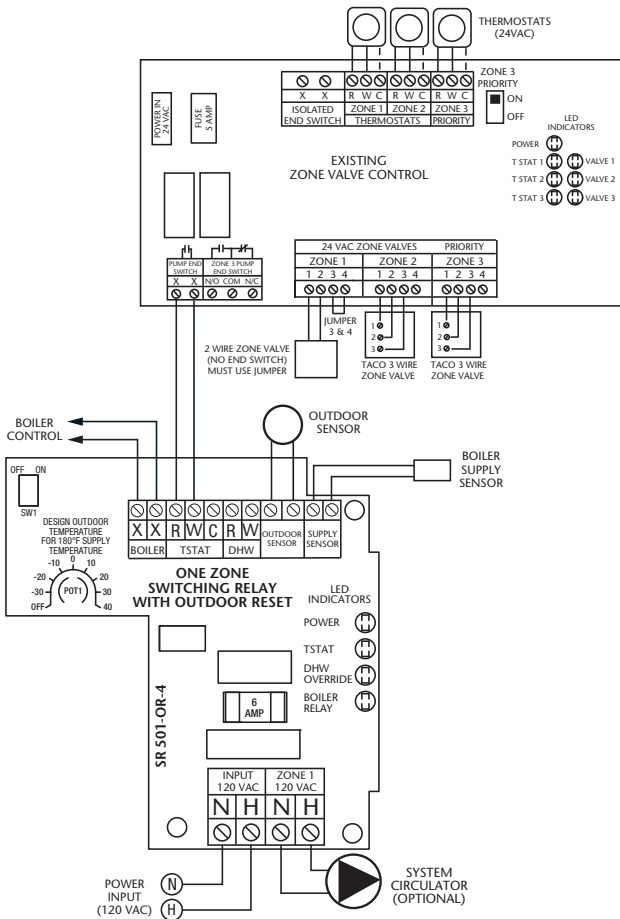
# SR501-OR-4 - One Zone Switching Relay with Outdoor Reset



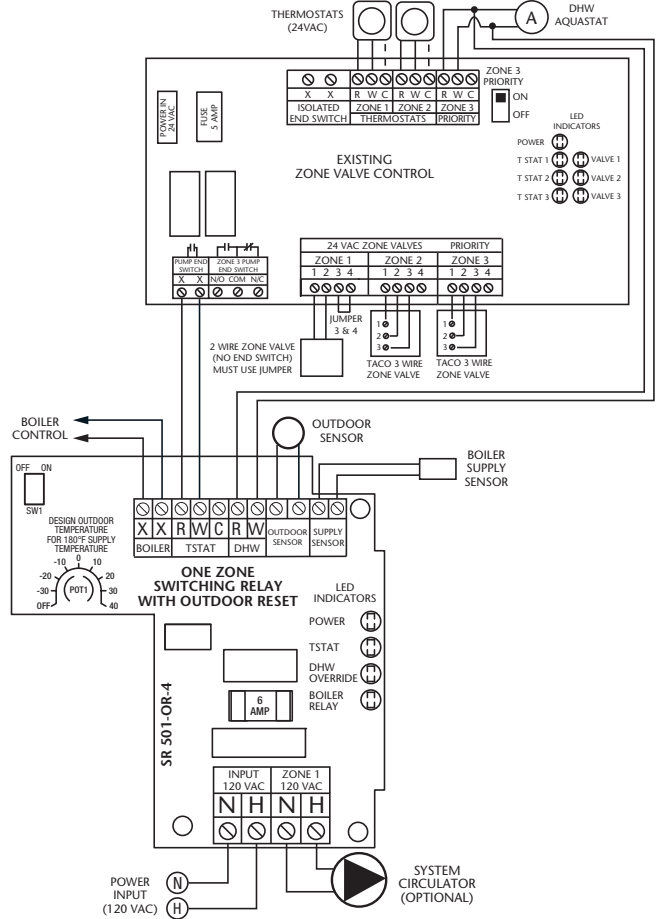
ONE ZONE INSTALLATION  
W/O INDIRECT DHW



ZONE VALVE INSTALLATION  
W/O ZONE CONTROL, W/O INDIRECT DHW



MULTI-ZONE INSTALLATION  
WITH ZONE CONTROL, W/O INDIRECT DHW



MULTI-ZONE INSTALLATION  
WITH ZONE CONTROL, WITH INDIRECT DHW

# SAFETY NOTICE

## TWO SEPARATE sources of power may be connected to an oil boiler's aquastat control.

### Service Technicians:

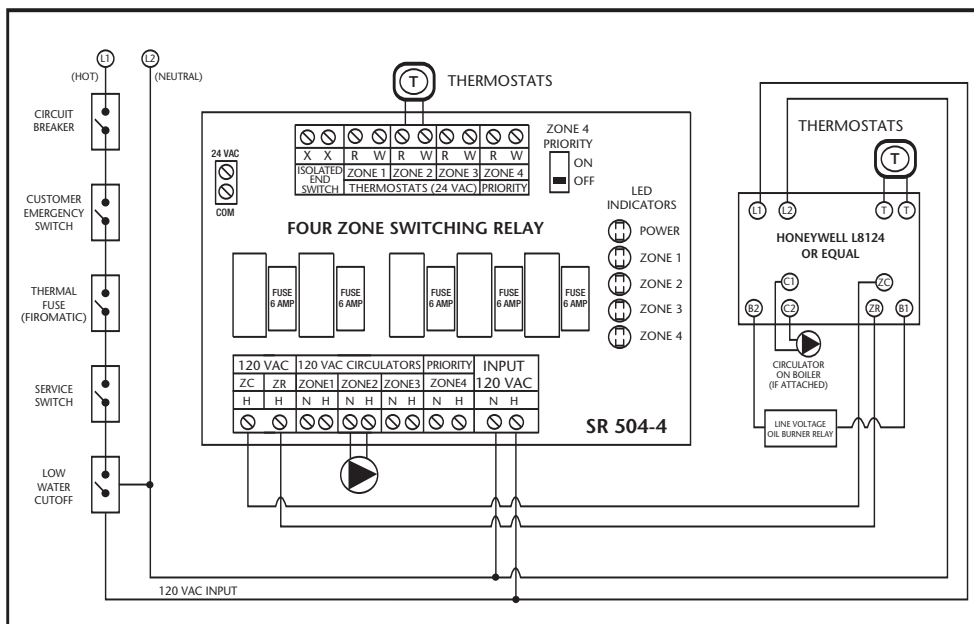
Be alert to potential hazard when using any brand or any style switching relay control in conjunction with an oil fired boiler. All power to the boiler may not be routed through the service switch.

Before servicing an oil fired boiler make sure the service switch is turned off. Then confirm that a secondary source of power does not exist to the boiler aquastat control. Failure to check could result in the boiler being activated when a zone calls, resulting in serious injury or death.

### How to check for two power sources:

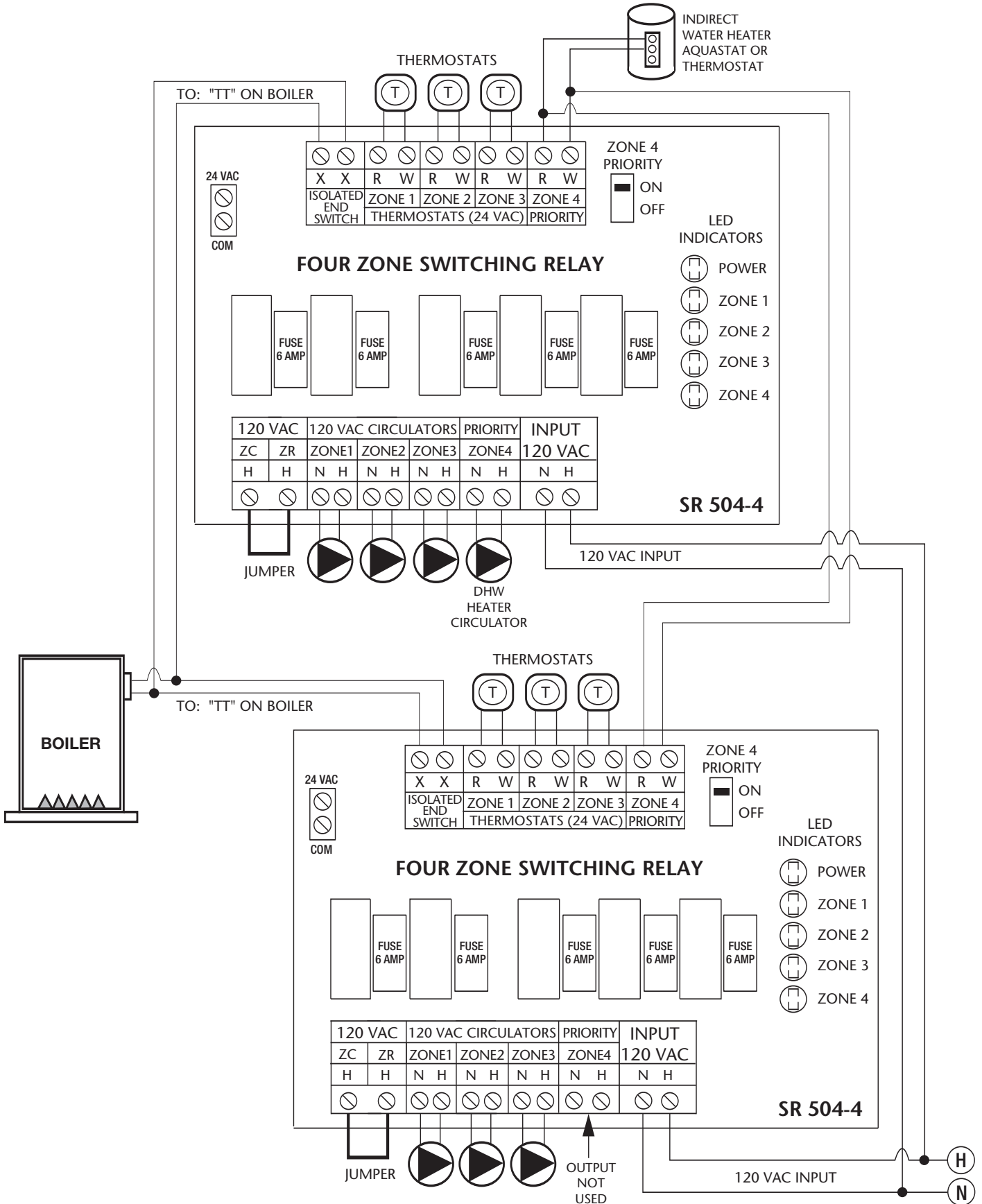
1. Turn off the service switch.
2. Is the switching relay's power light ON?  
No = no secondary source of power connected to the boiler  
Yes = a secondary source may be connected, see step 3
3. Is the ZR contact of the switching relay connected directly to the ZR contact of the oil boiler's aquastat control (does not go through the service switch)?  
NO = no secondary source of power connected  
Yes = a secondary source is connected, see step 4
4. Re-wire the system in accordance to the diagram below. Failure to fix the problem could result in the boiler being activated when a zone calls, resulting in serious injury or death.

### How to correct the wiring:



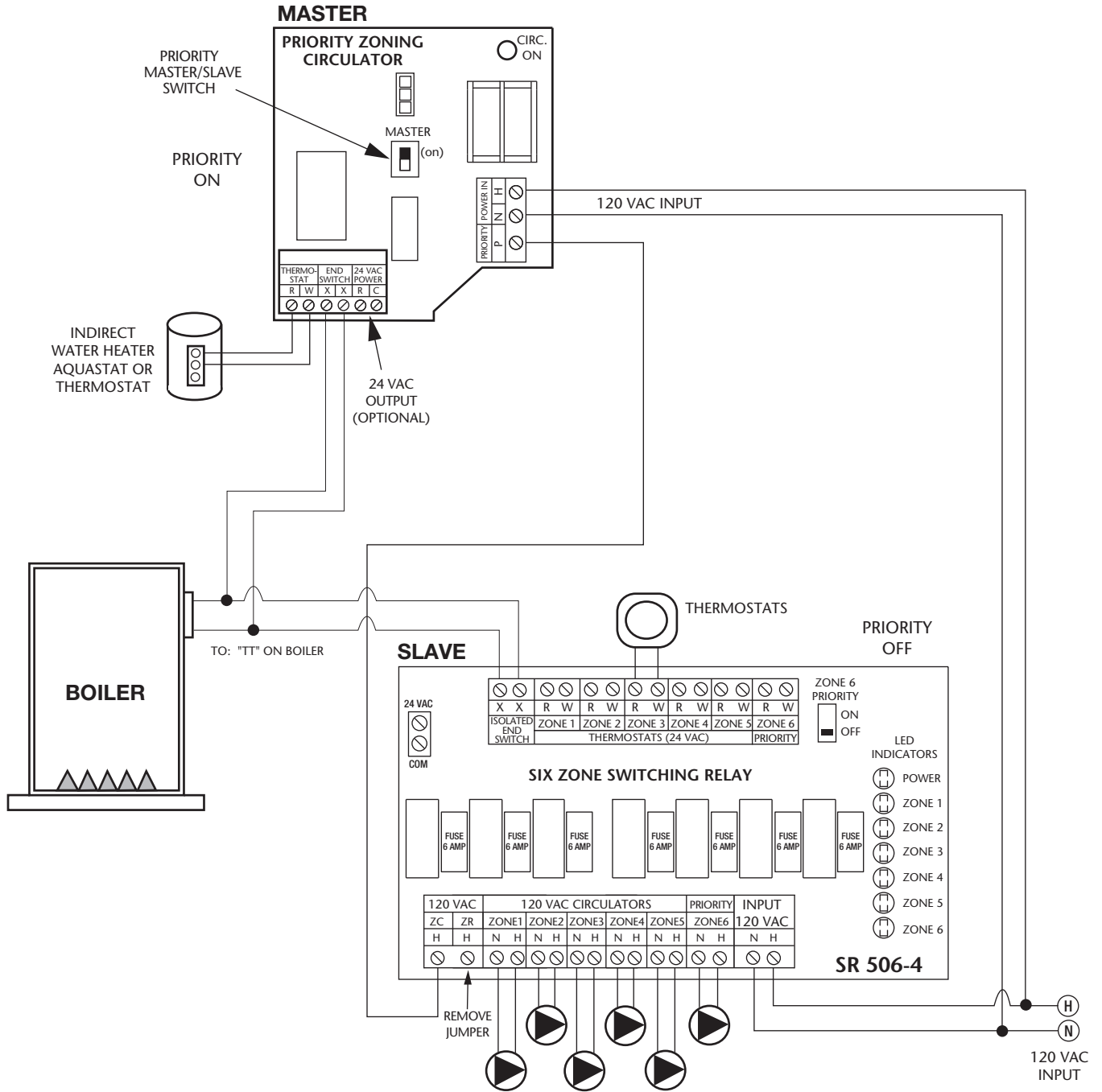
NOTE: Tankless coil has priority.

# Two Switching Relays Connected Together

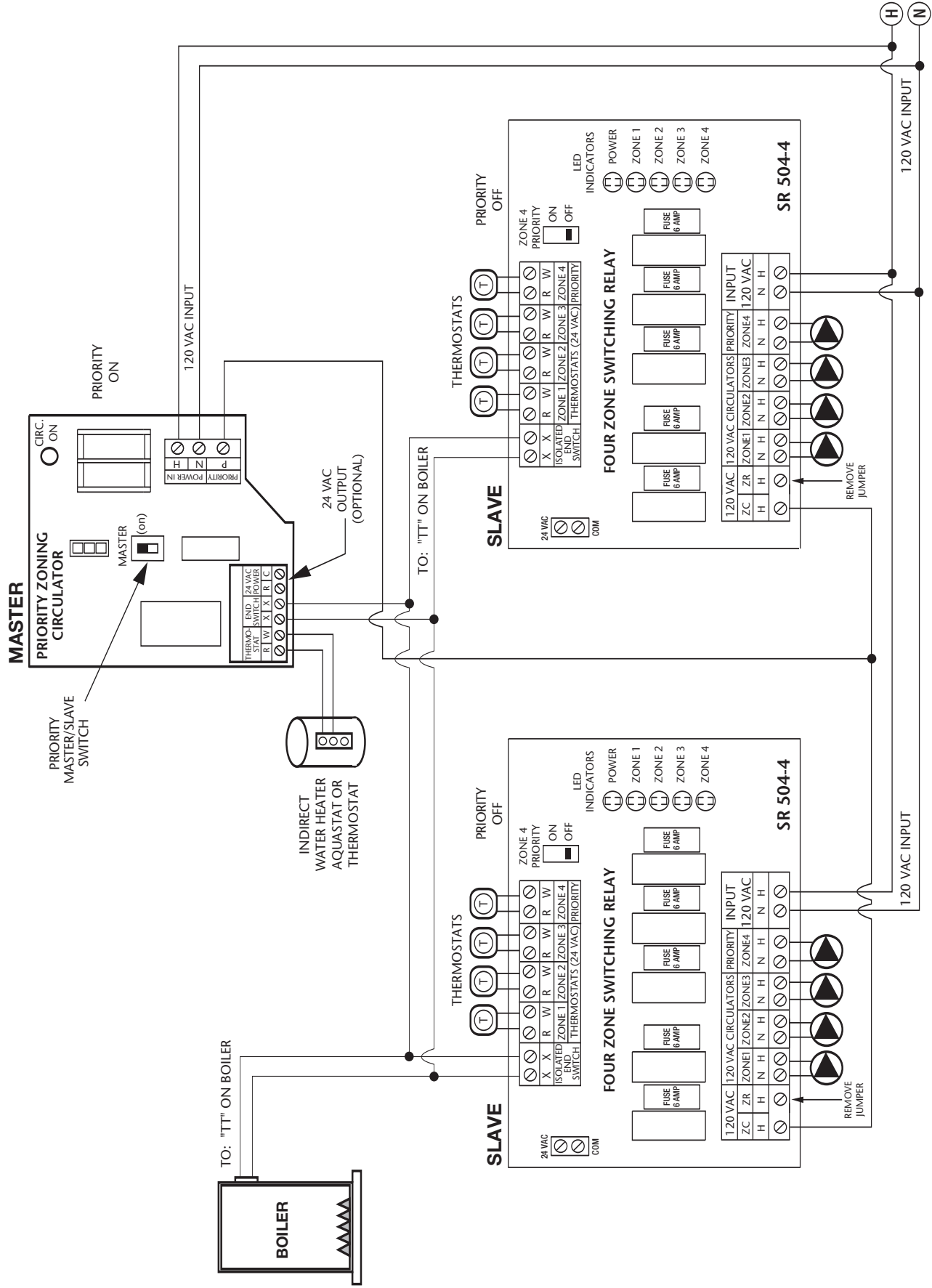




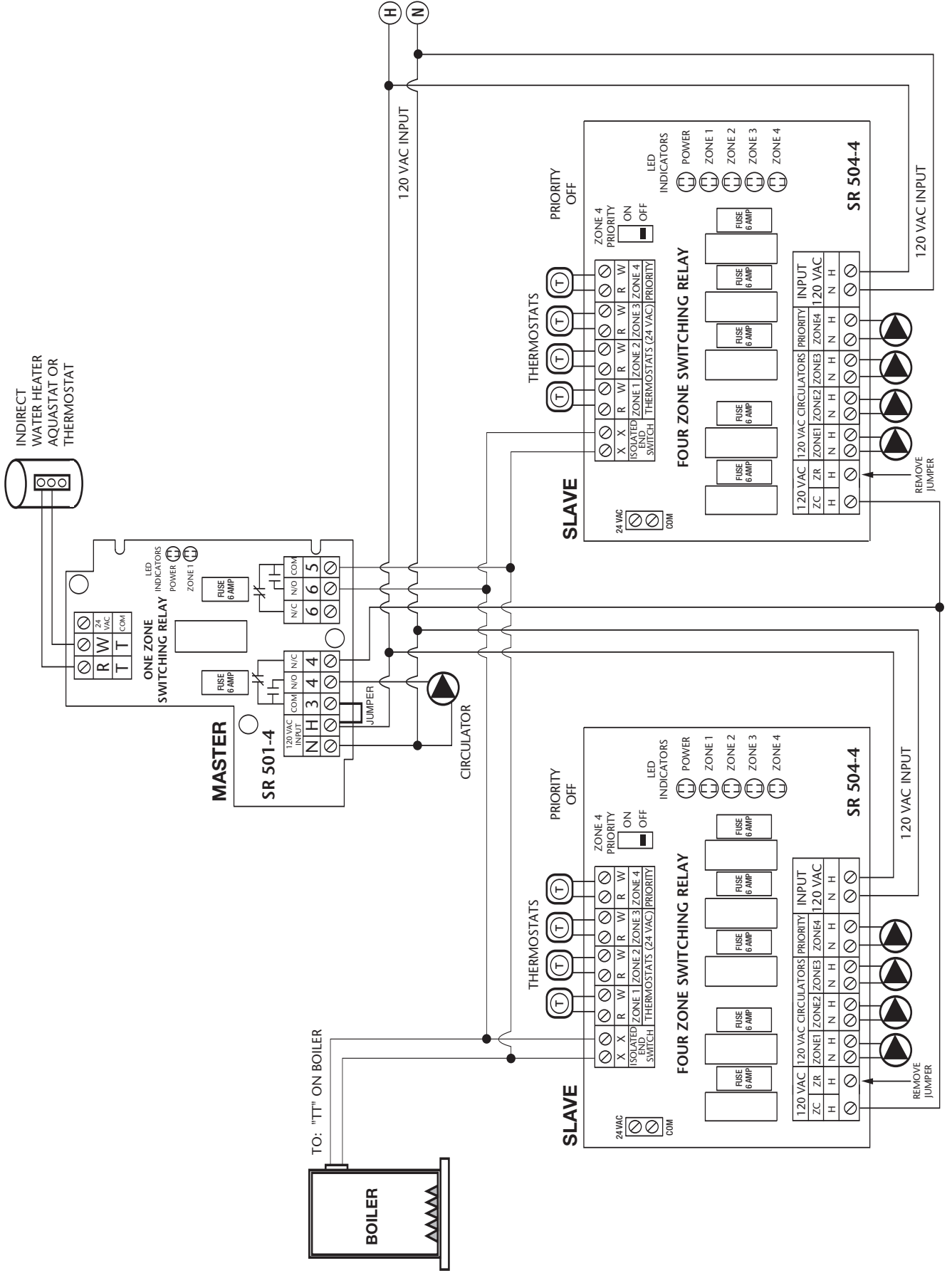
# Priority Zoning Circulator Controlling Switching Relay



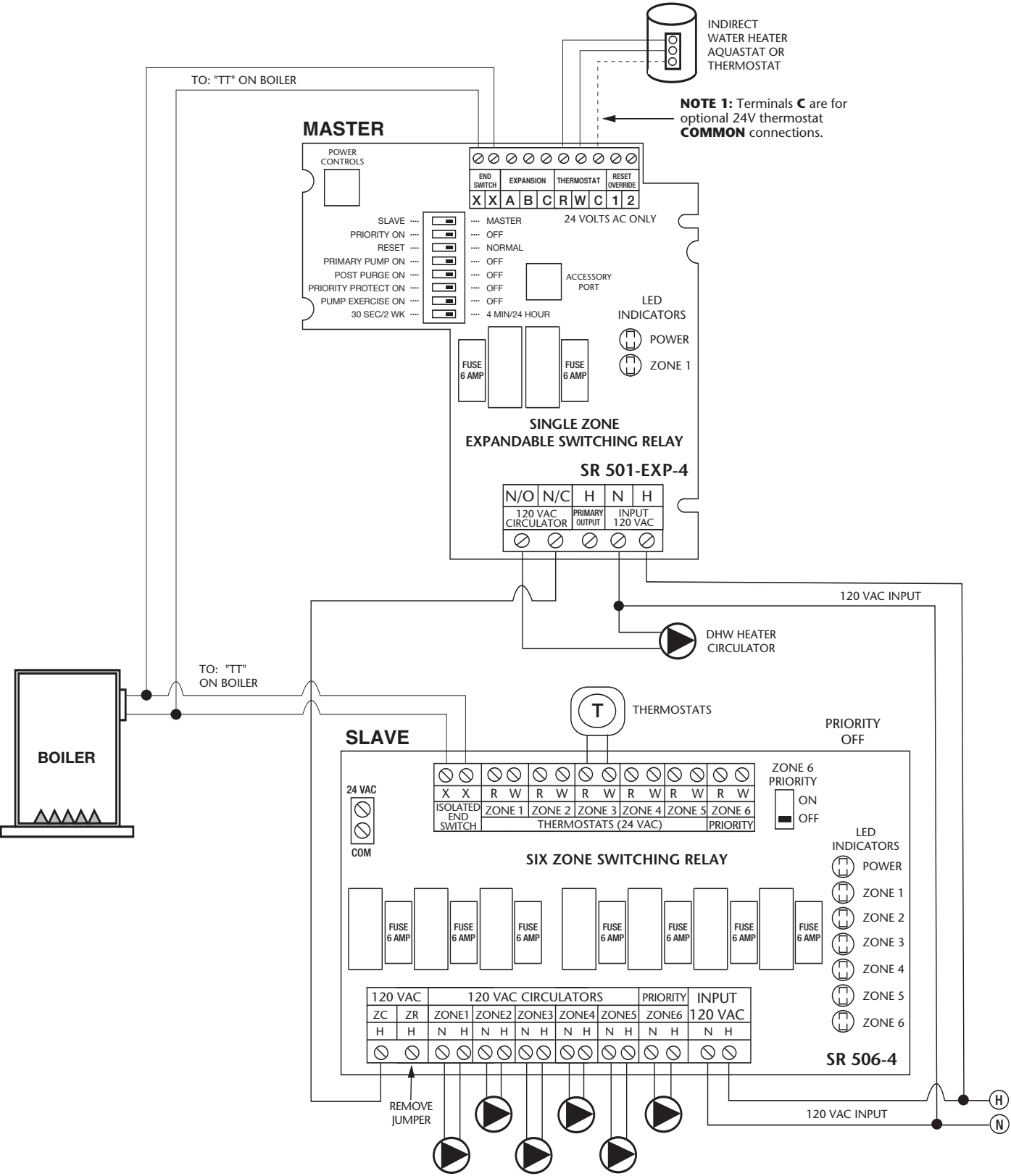
# Priority Zoning Circulator Controlling 2 Switching Relays



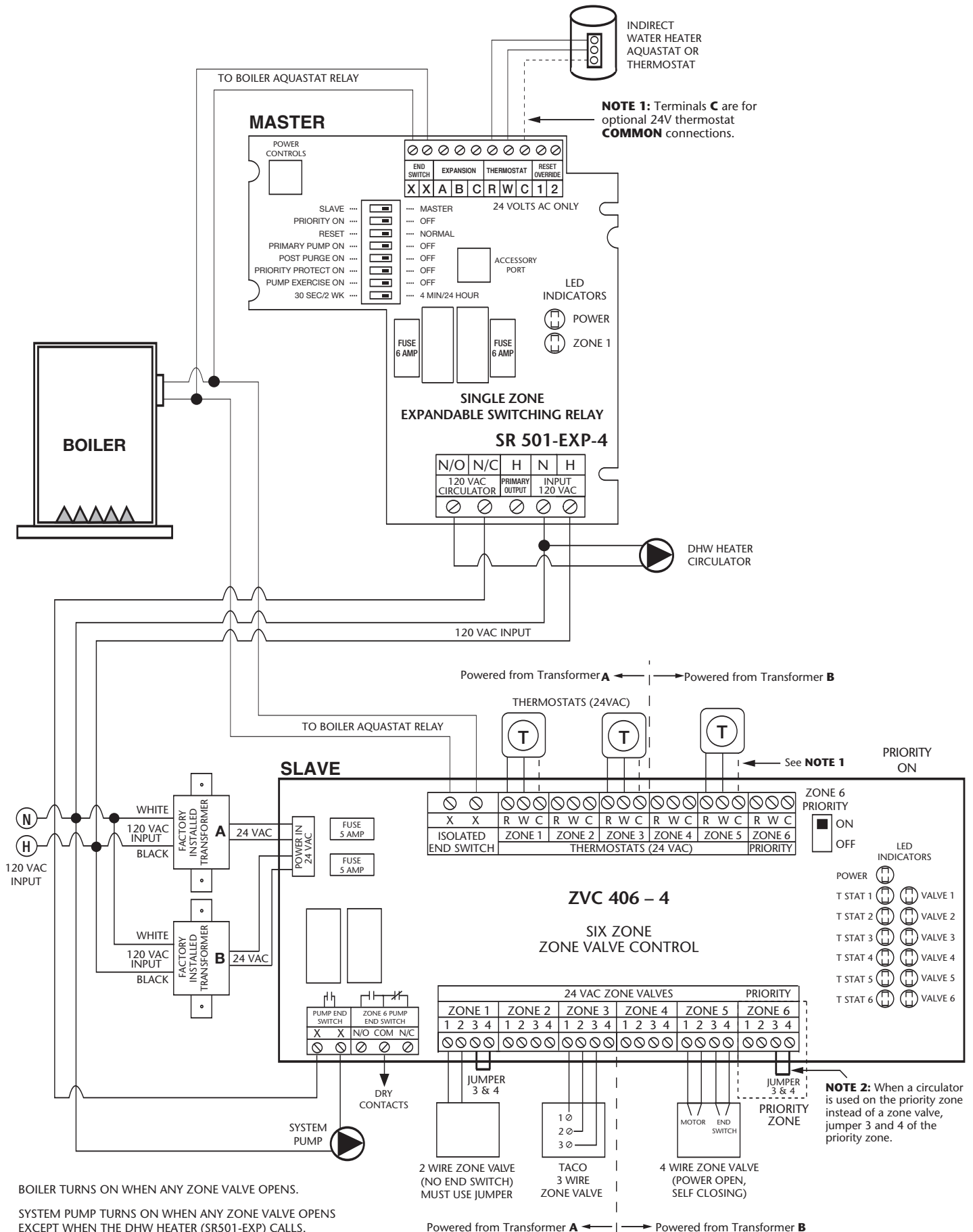
# SR501 Switching Relay Controlling 2 Switching Relays



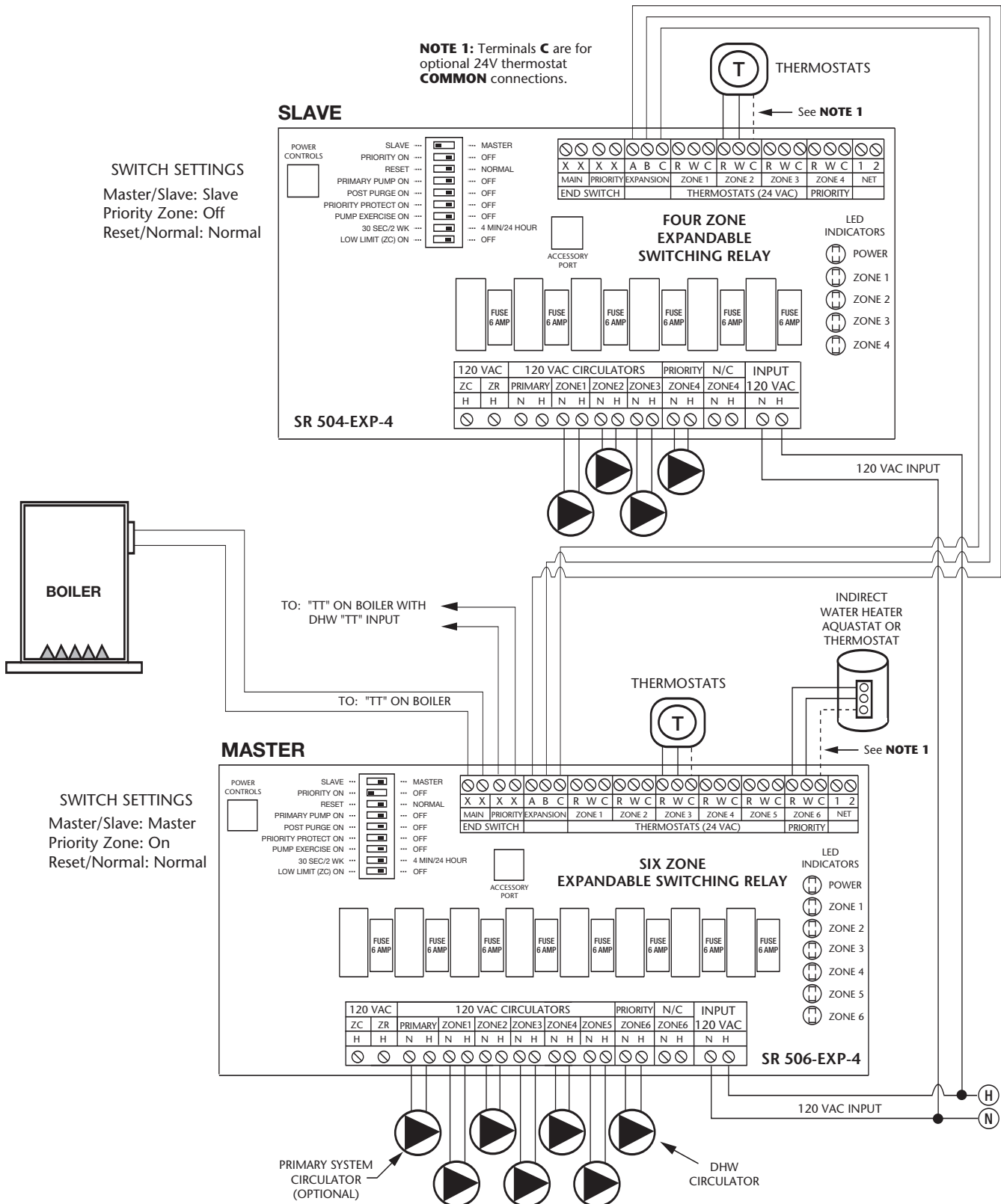
# SR501-EXP Switching Relay Controlling Another Switching Relay



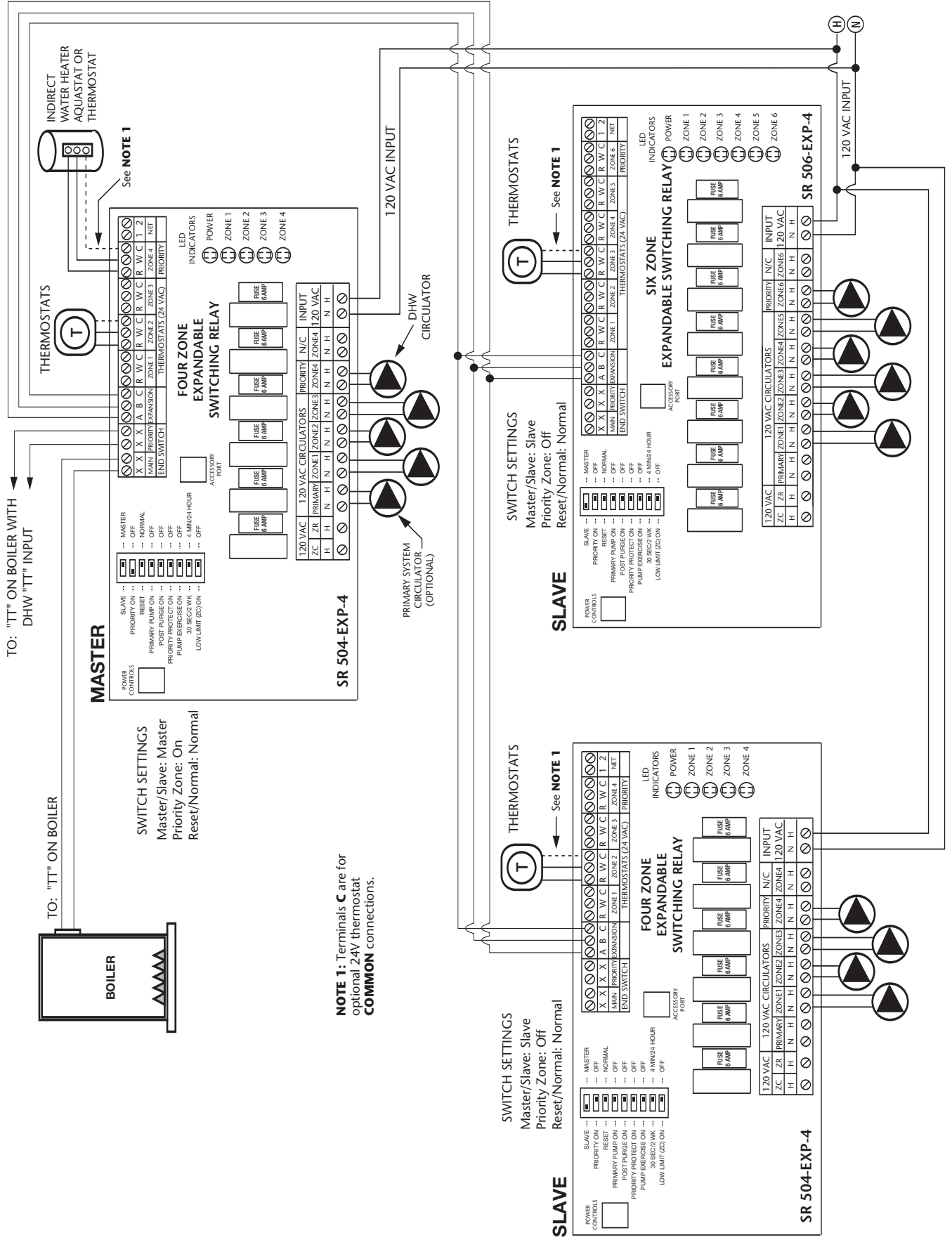
# SR501-EXP Switching Relay Controlling a Zone Valve Control



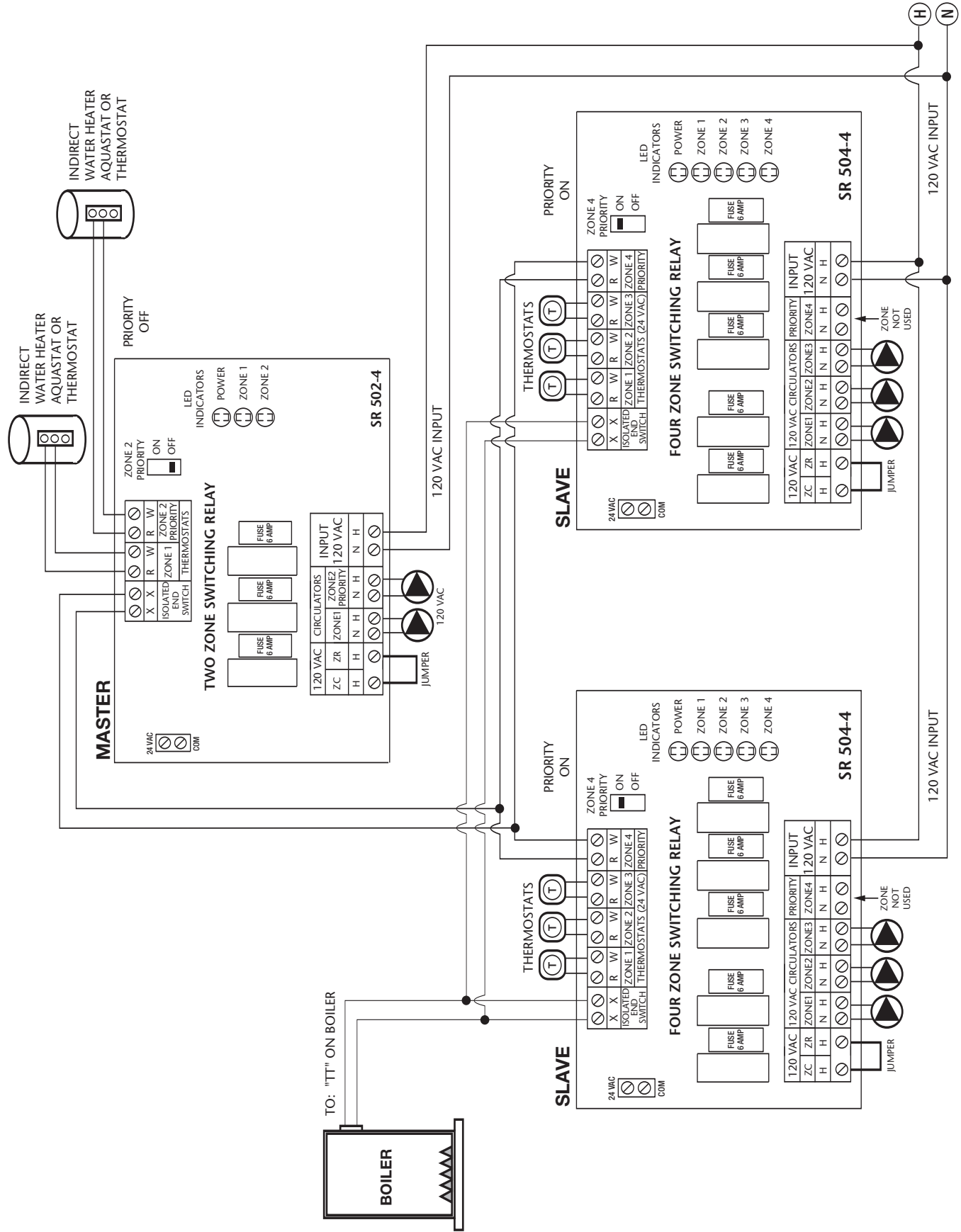
## 2 Expandable Switching Relays Connected Together



# 3 Expandable Switching Relays Connected Together

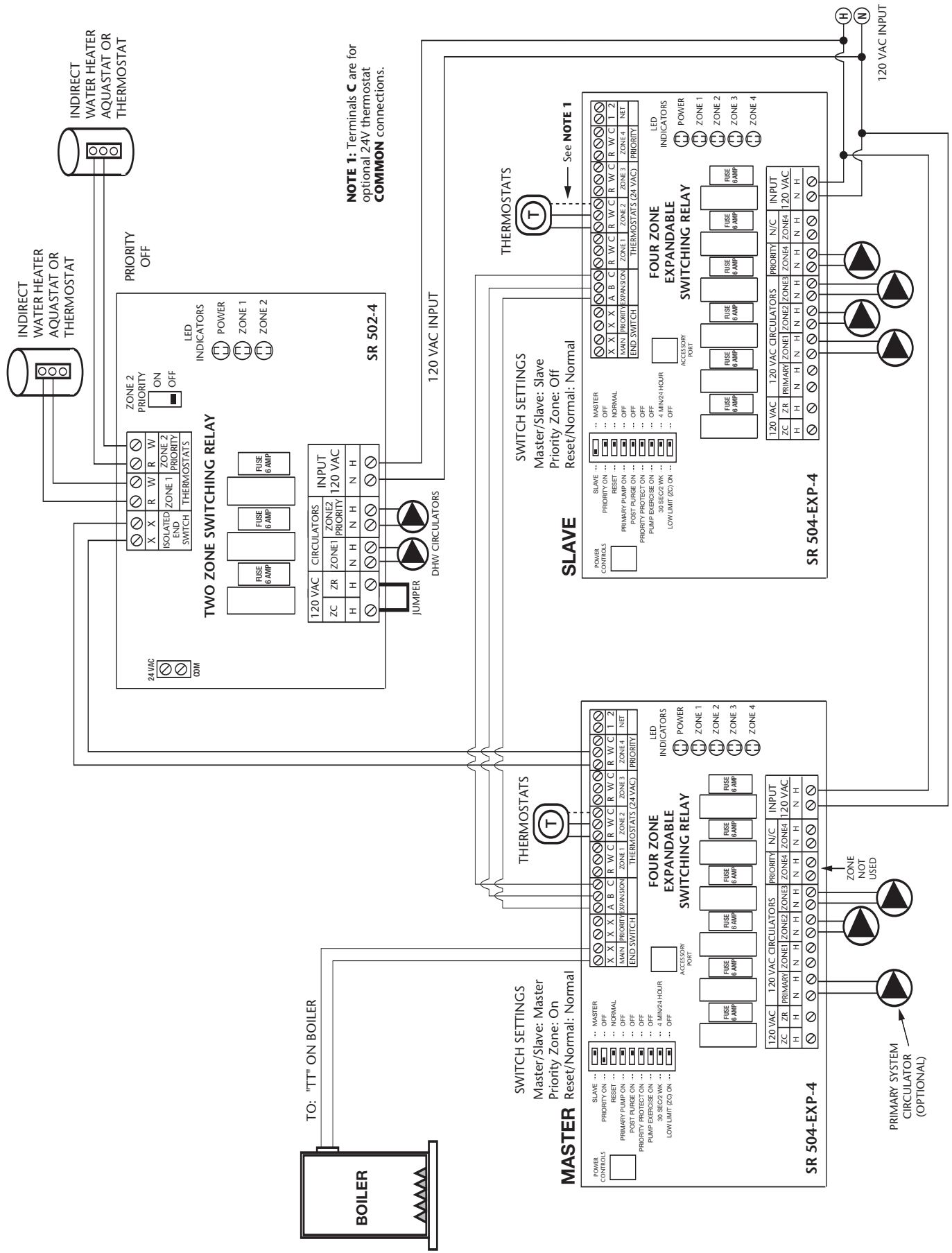


# 2 Indirect Water Heaters with Priority Connected to Standard Switching Relays

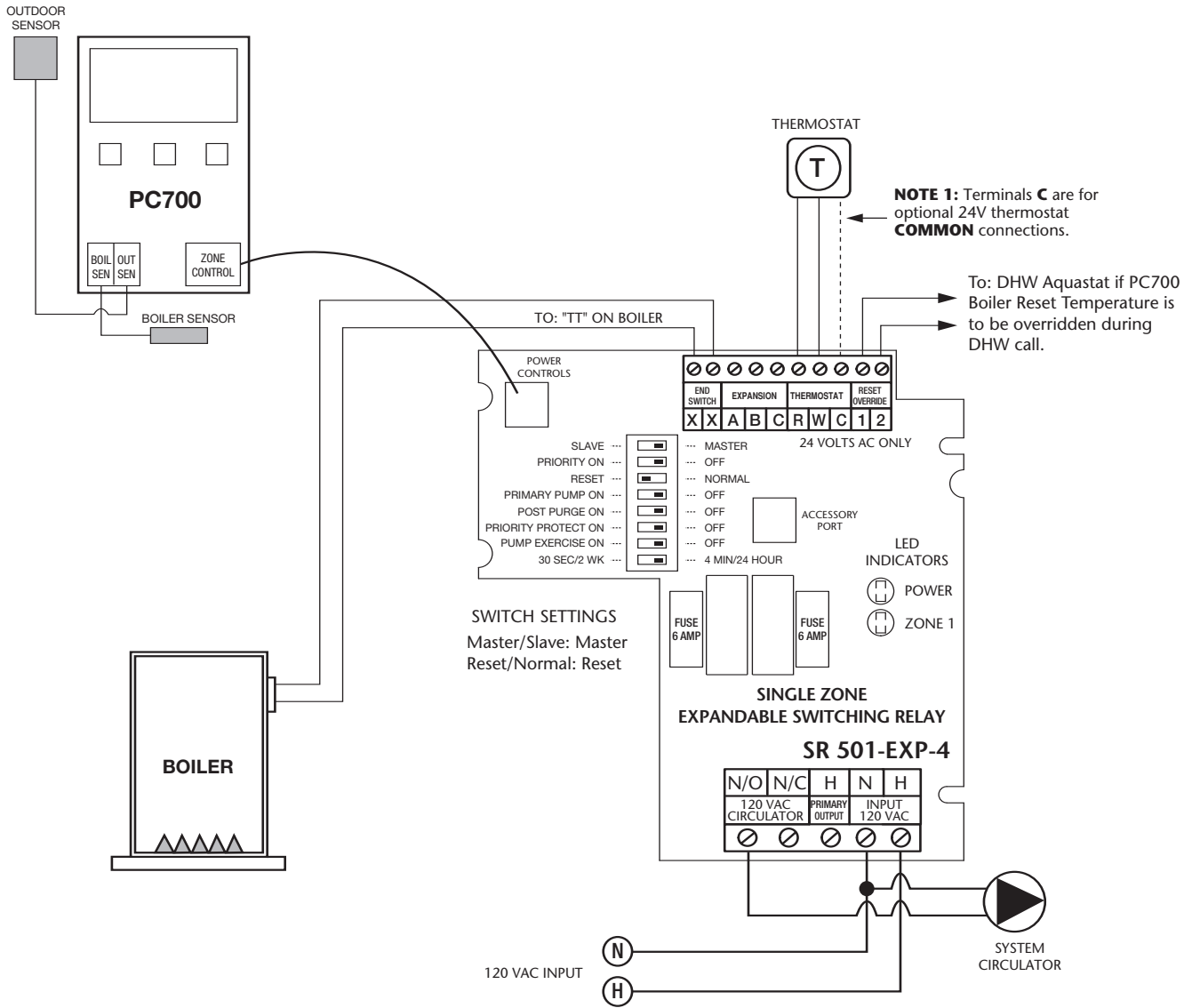




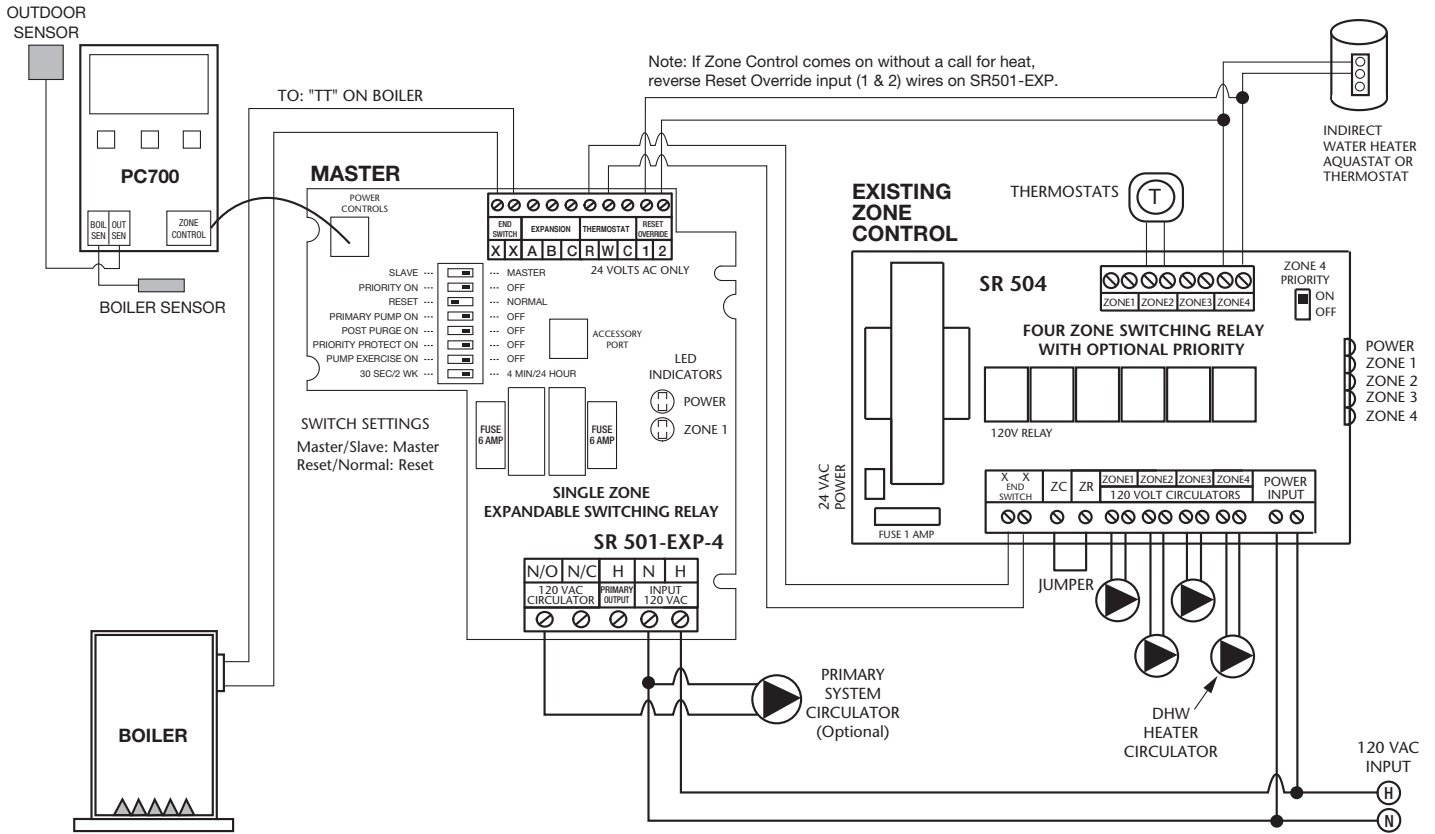
## 2 Indirect Water Heaters with Priority Connected to EXP Switching Relays



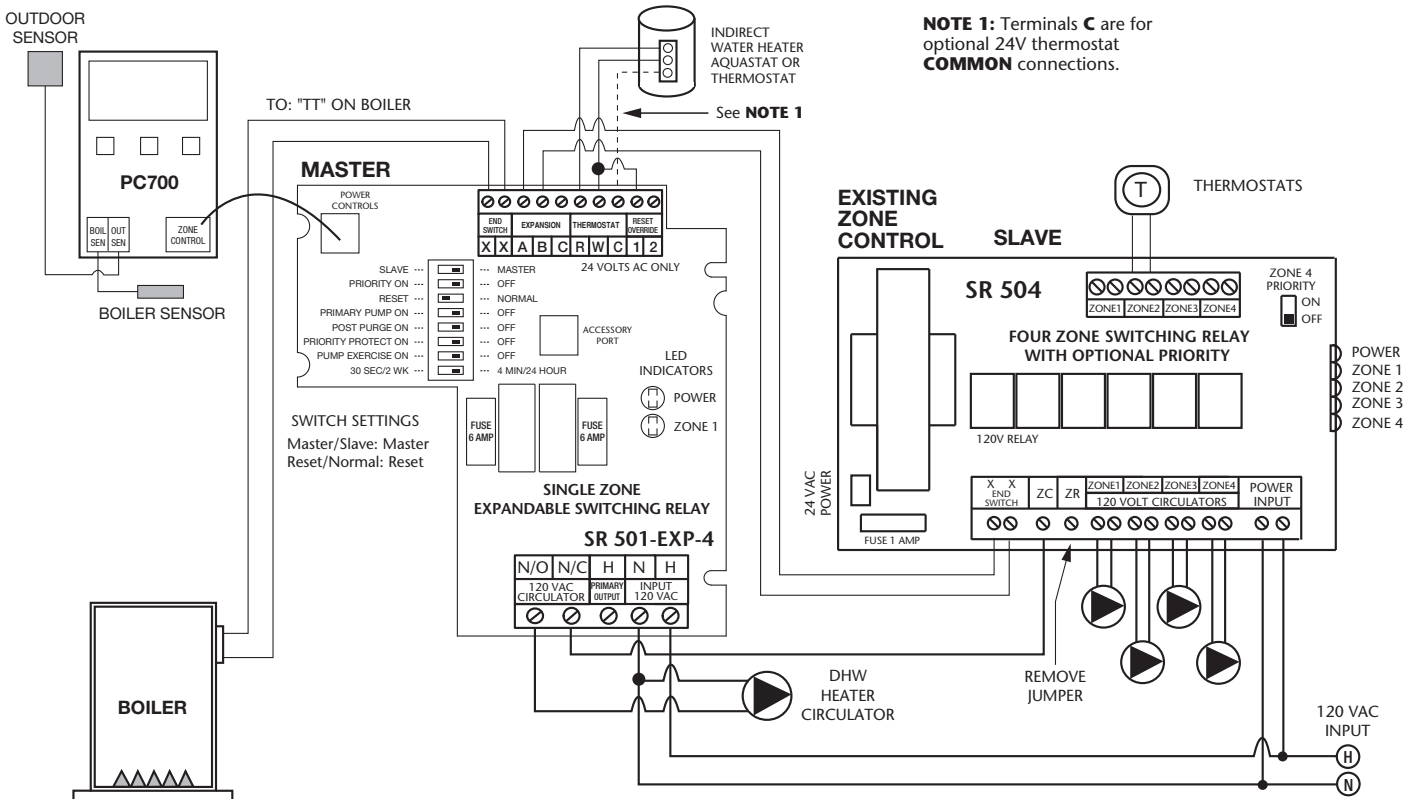
# PC700 Boiler Reset Control Connected to SR501-EXP Switching Relay



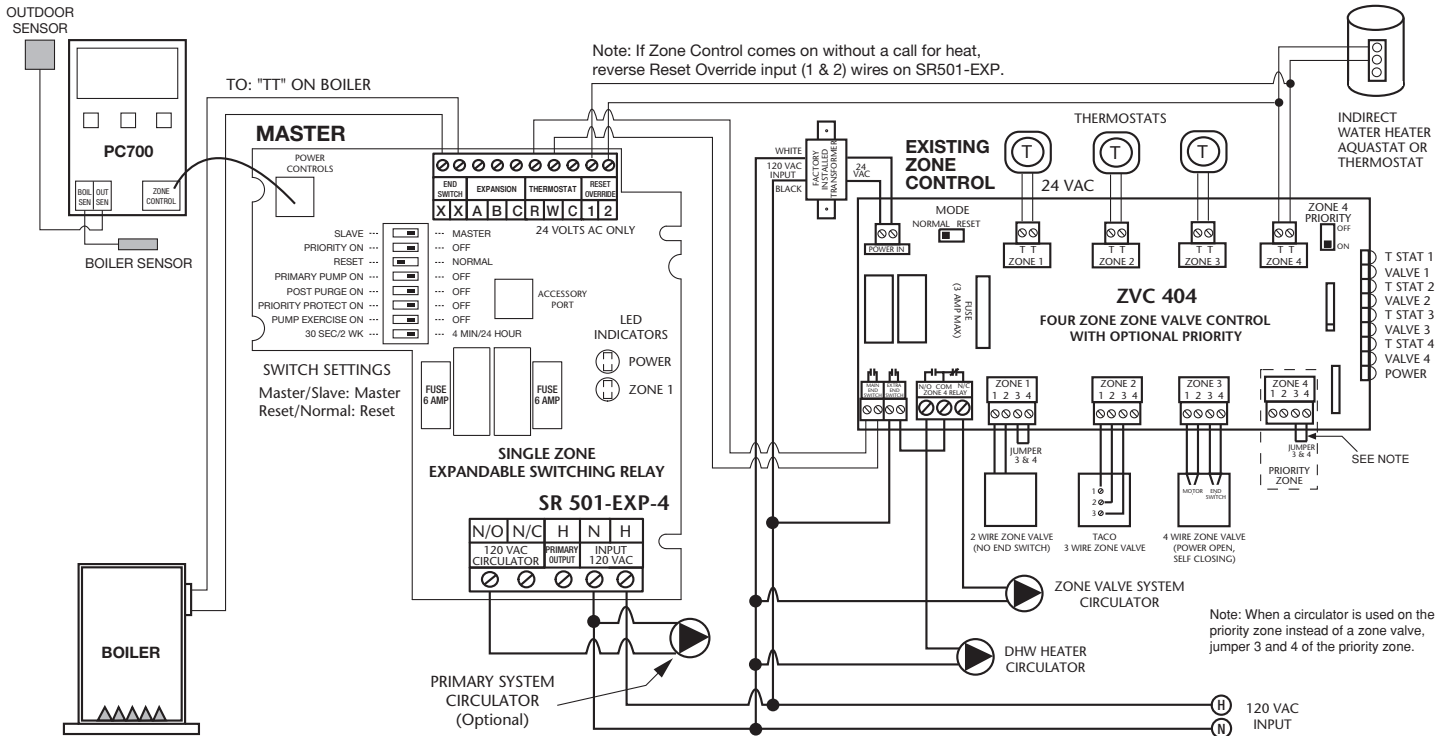
# SR501-EXP and PC700 Boiler Reset Control Connected to an Existing Switching Relay



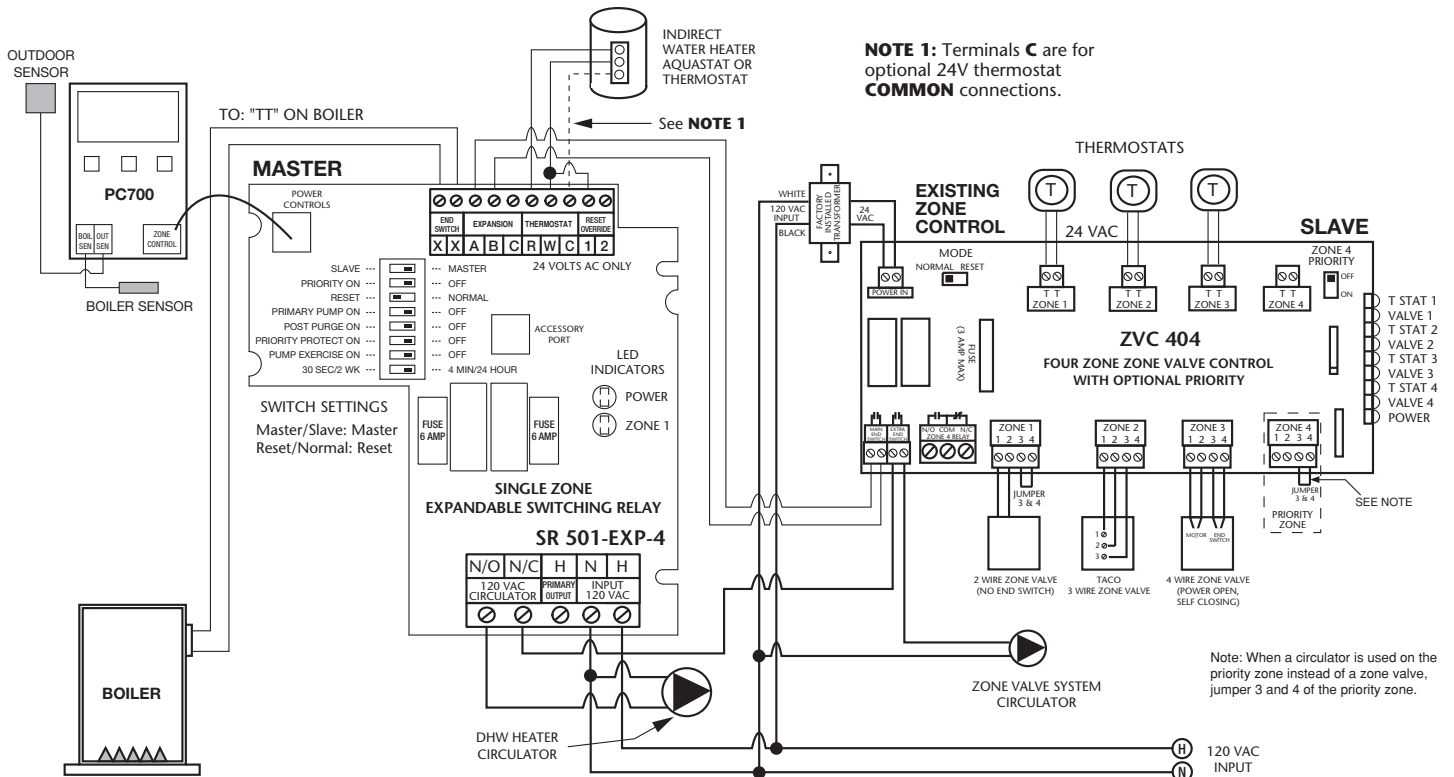
# Connecting a DHW Heater to an Existing Heating Only Switching Relay Using an SR501-EXP and PC700 Boiler Reset Control



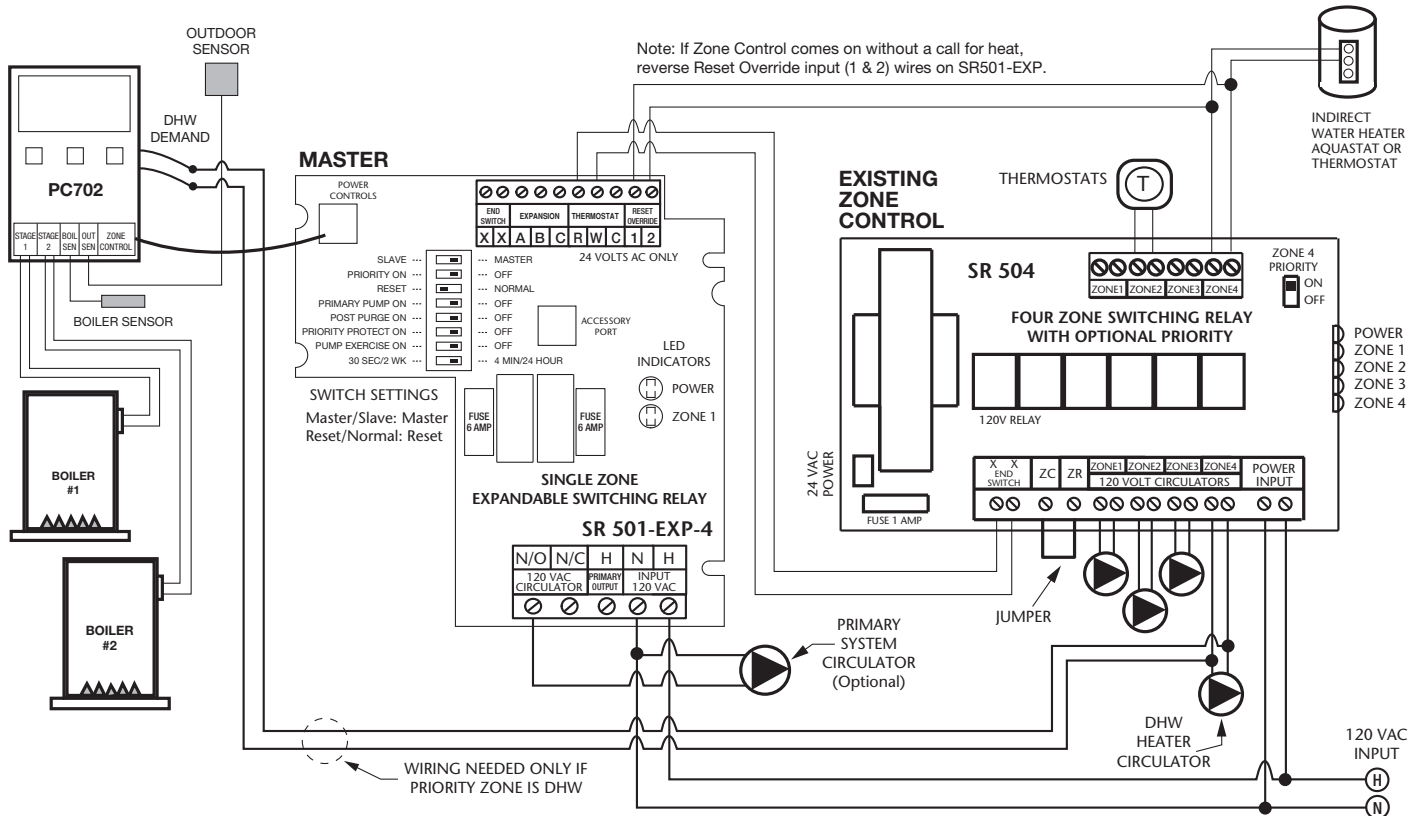
# SR501-EXP and PC700 Boiler Reset Control Connected to an Existing Zone Valve Control



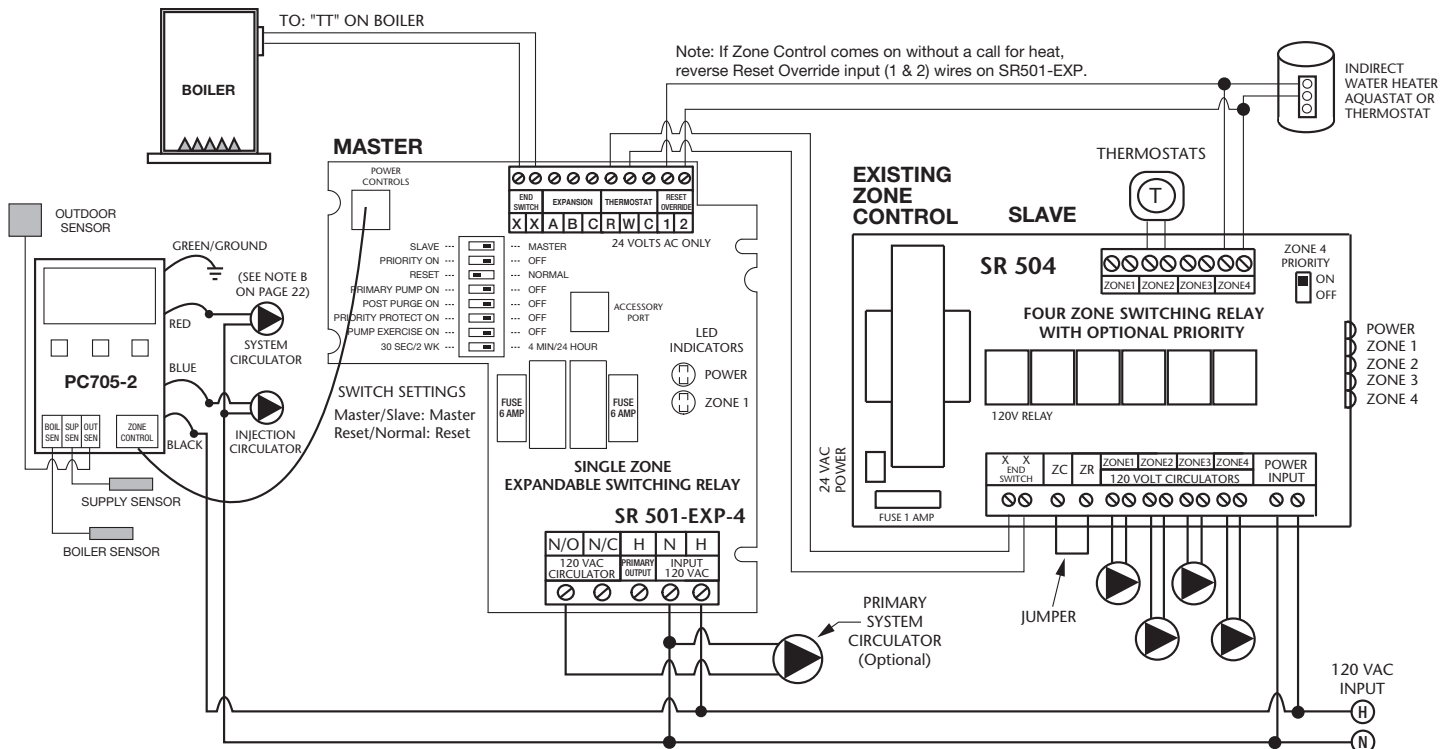
# Connecting a DHW Heater to an Existing Heating Only Zone Valve Control Using an SR501-EXP and PC700 Boiler Reset Control



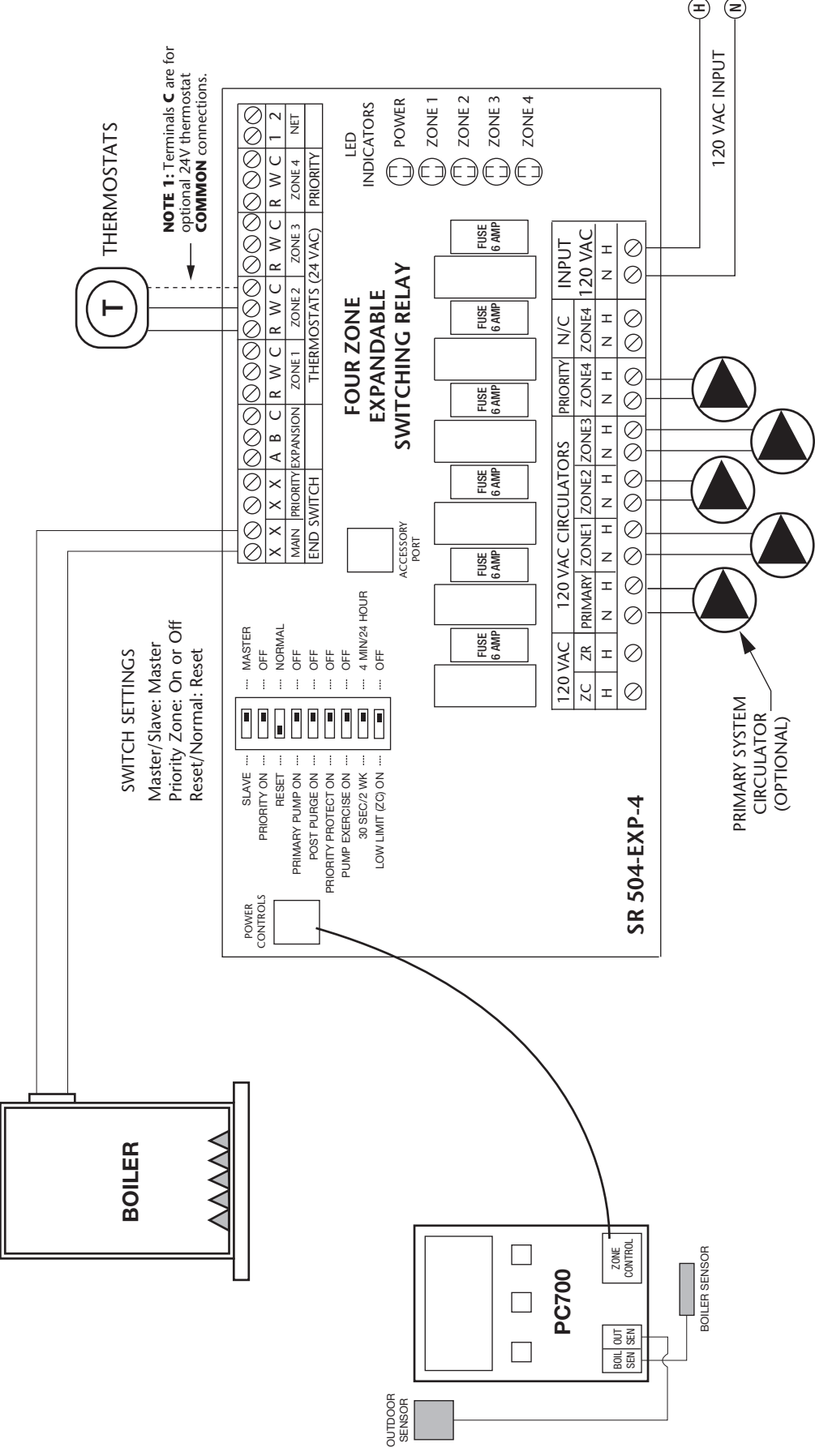
# SR501-EXP and PC702 Boiler Reset Control Connected to an Existing Switching Relay



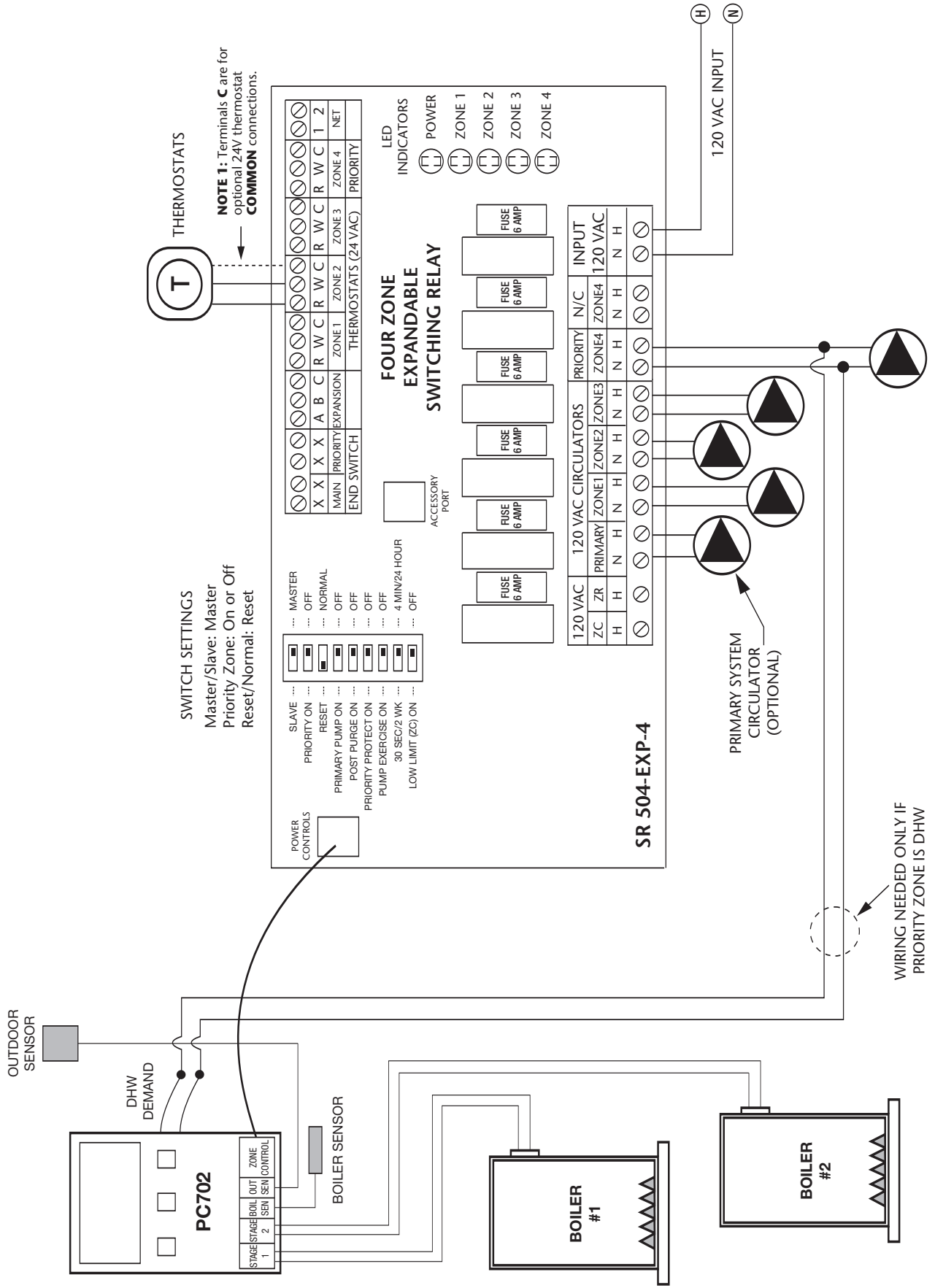
# SR501-EXP and PC705 Variable Speed Pump Injection Control Connected to an Existing Switching Relay



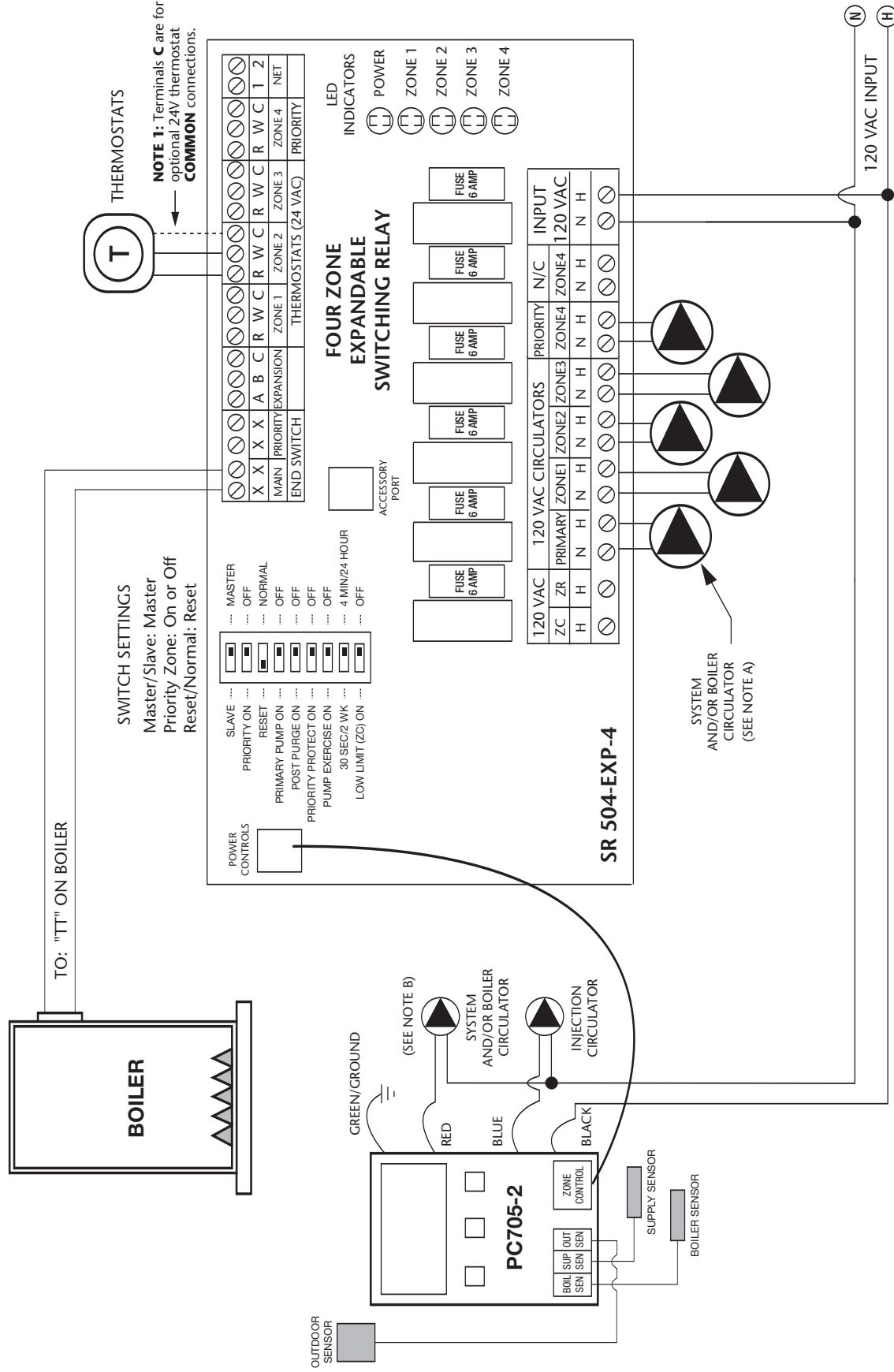
# PC700 Boiler Reset Control Connected to EXP Switching Relay



# PC702 2-Stage Boiler Reset Control Connected to EXP Switching Relay



# PC705 Variable Speed Pump Injection Control Connected to EXP Switching Relay

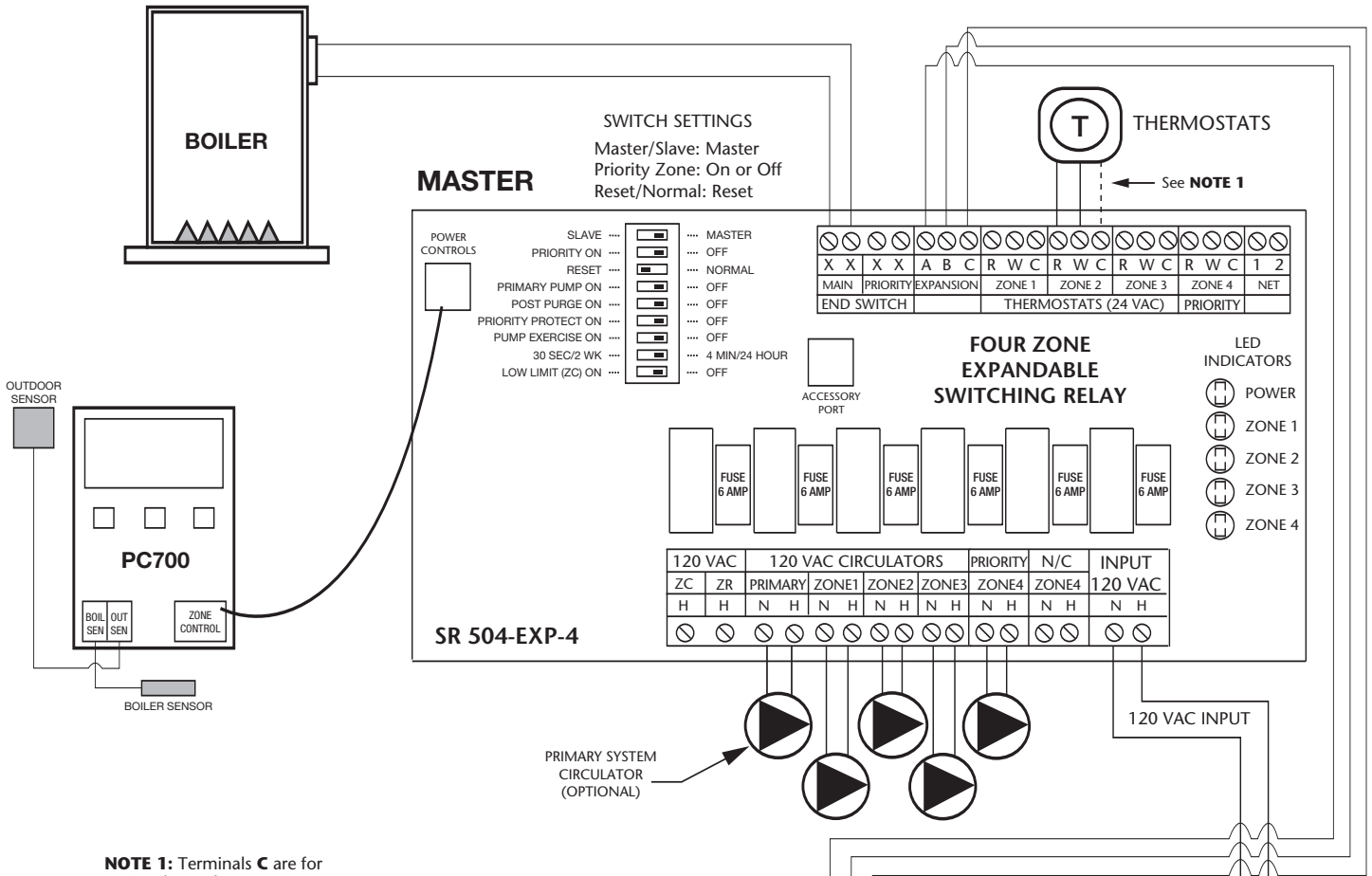


**NOTE A:** WHEN SYSTEM CIRCULATOR IS CONNECTED TO PRIMARY CIRCULATOR TERMINAL ON SWITCHING RELAY, THE PRIMARY PUMP DIP SWITCH SETS OPERATION OF THIS OUTPUT.

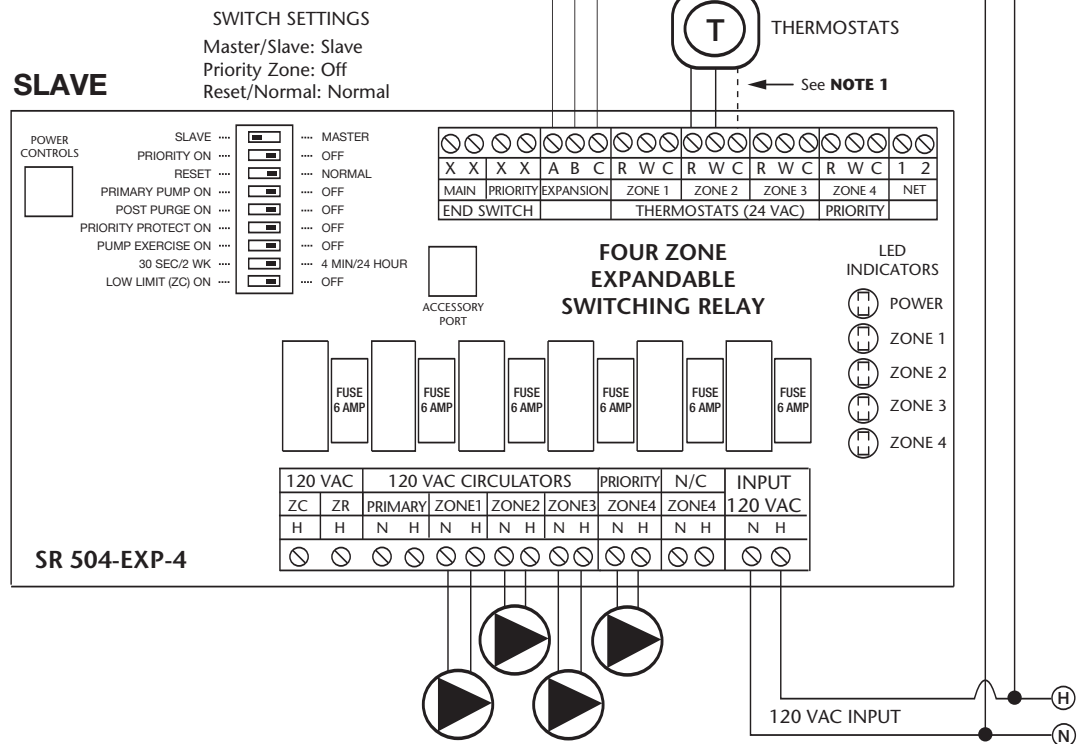
**NOTE B:** WHEN SYSTEM CIRCULATOR IS CONNECTED TO RED WIRE ON PC705-2, THE CIRCULATOR WILL OPERATE ONLY WHEN THERMOSTAT CALLS FOR HEAT AND THE OUTDOOR TEMPERATURE IS BELOW THE WARM WEATHER SHUT DOWN (WWSD) TEMPERATURE. THE WWSD CAN BE ADJUSTED OR TURNED OFF SO THAT THE CIRCULATOR IS NOT AFFECTED BY OUTDOOR TEMPERATURE.



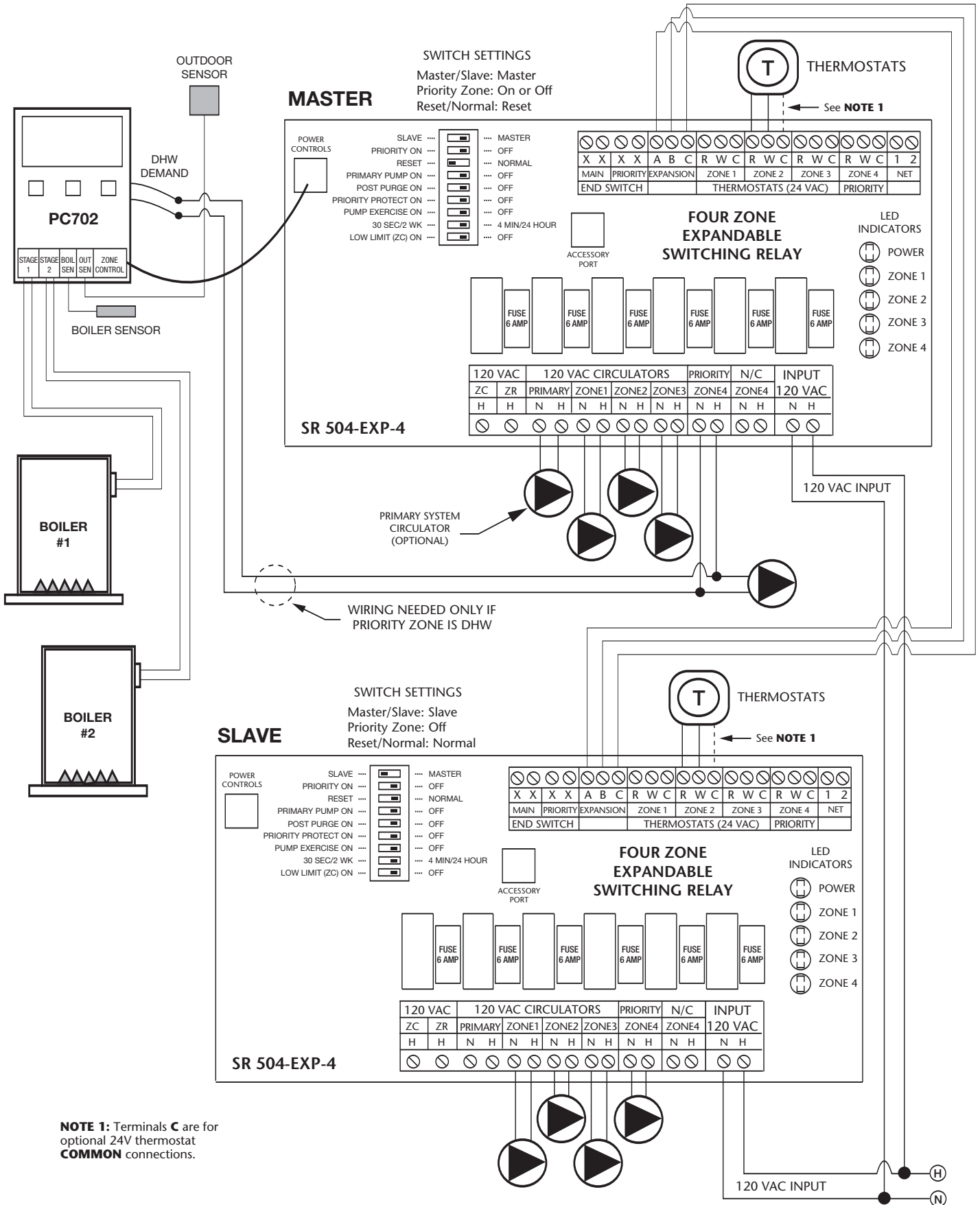
# PC700 Boiler Reset Control Connected to 2 EXP Switching Relays



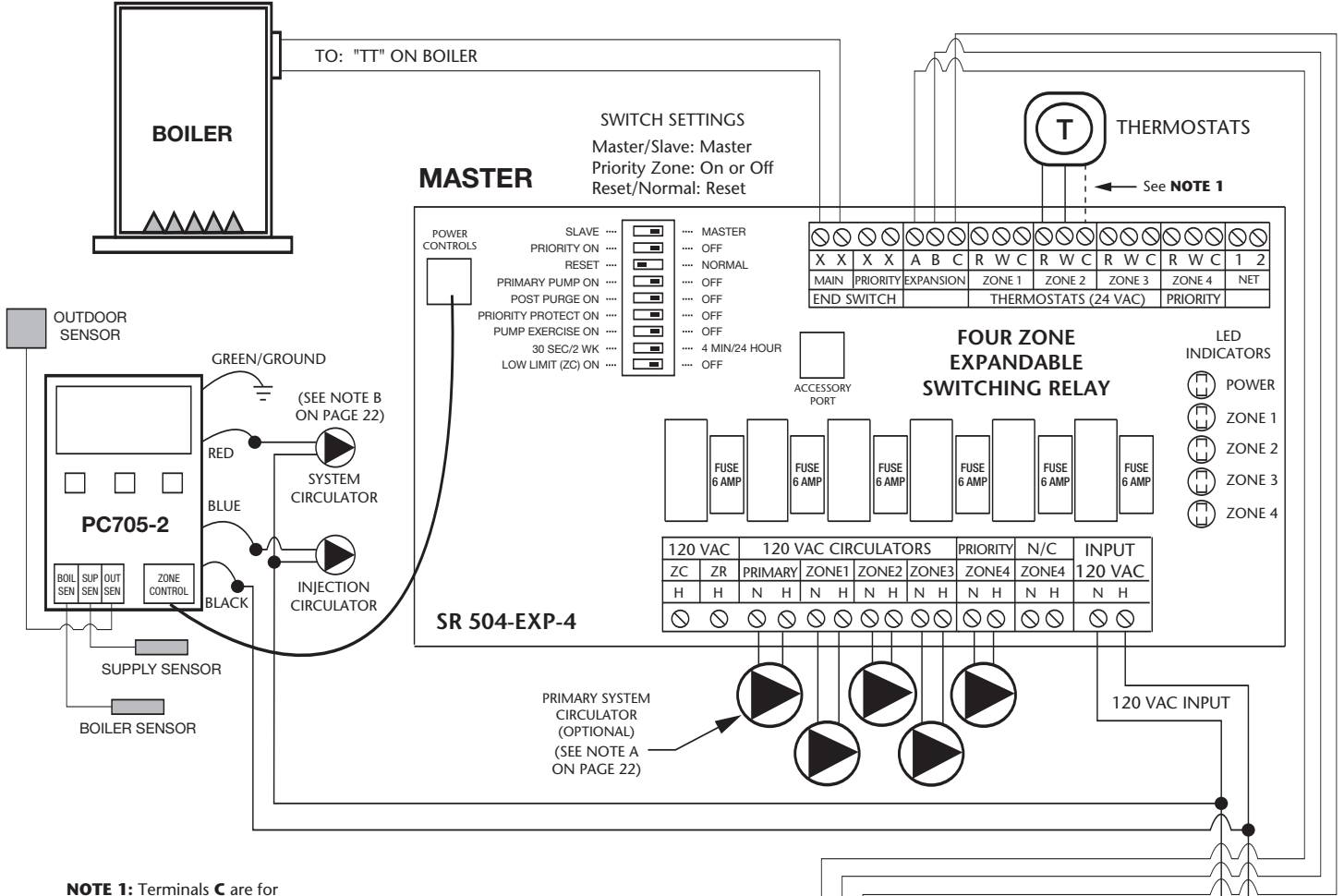
**NOTE 1:** Terminals C are for optional 24V thermostat COMMON connections.



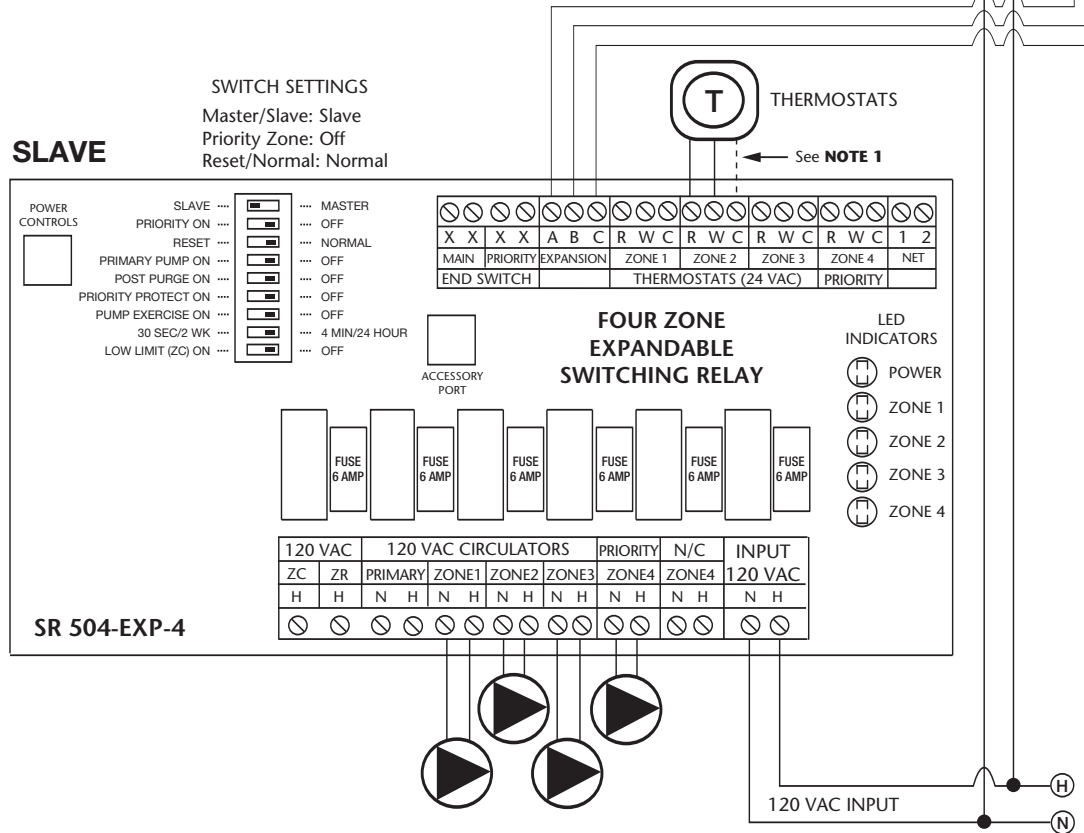
# PC702 2-Stage Boiler Reset Control Connected to 2 EXP Switching Relays



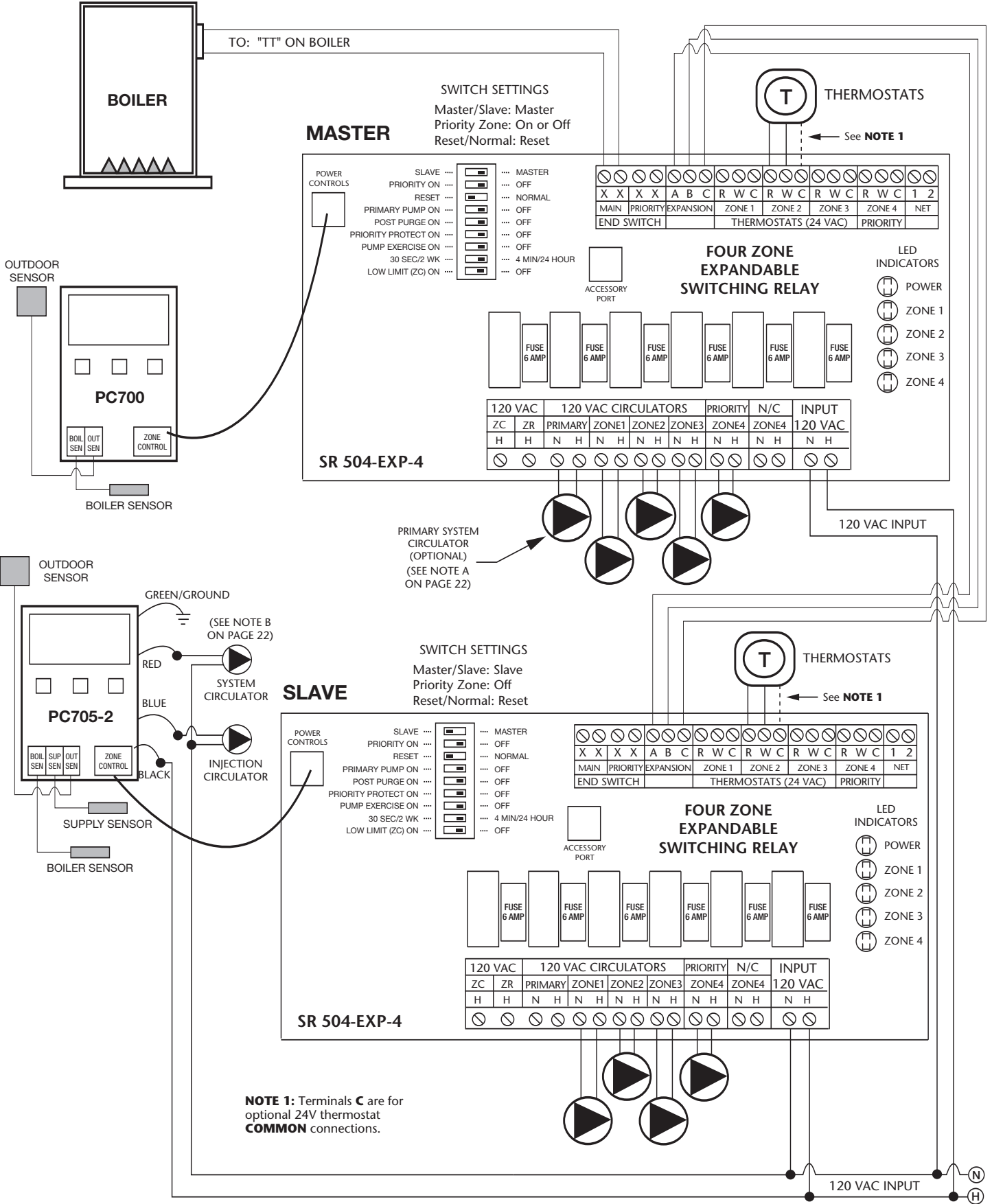
# PC705 Variable Speed Pump Injection Control Connected to 2 EXP Switching Relays



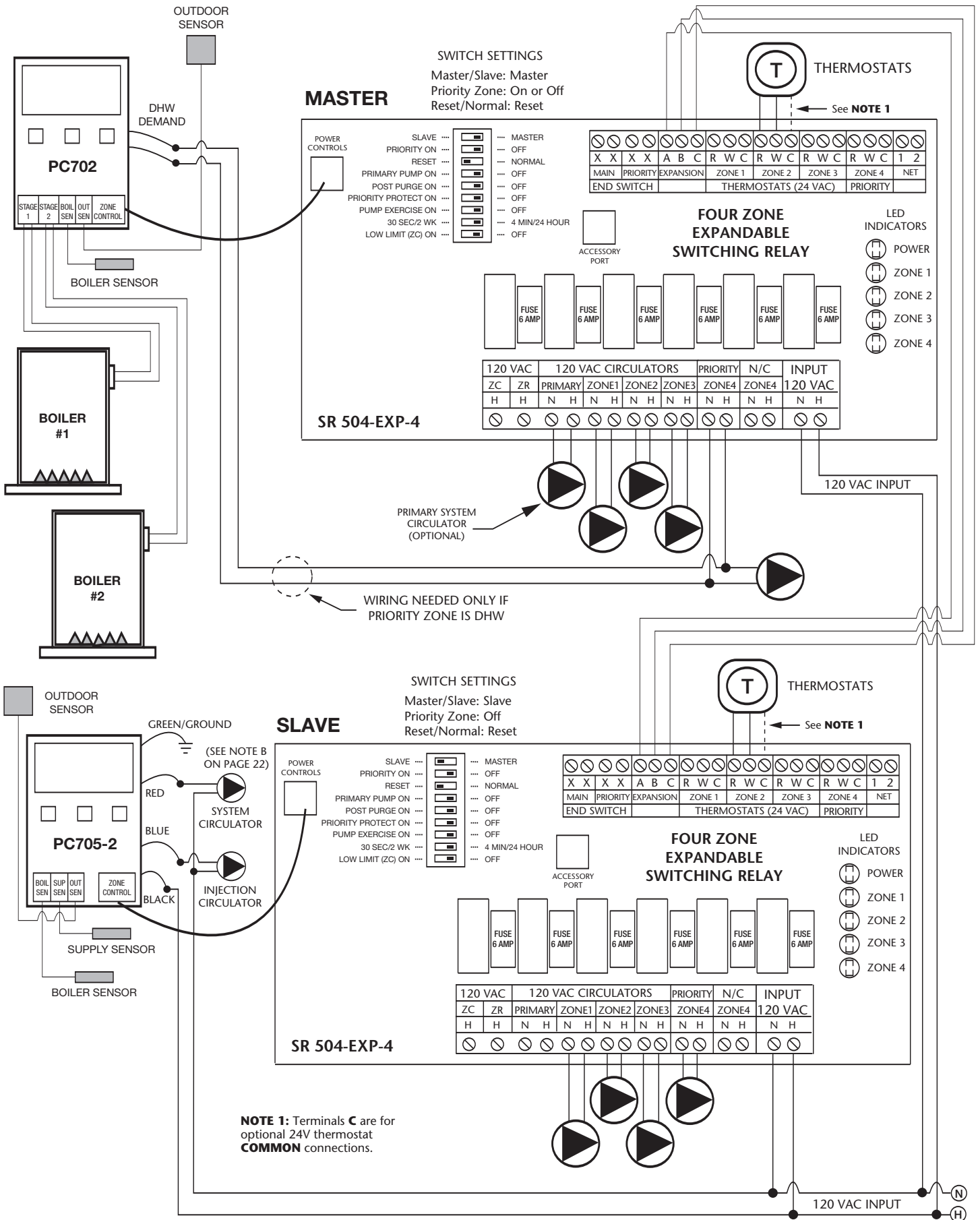
**NOTE 1:** Terminals **C** are for optional 24V thermostat **COMMON** connections.



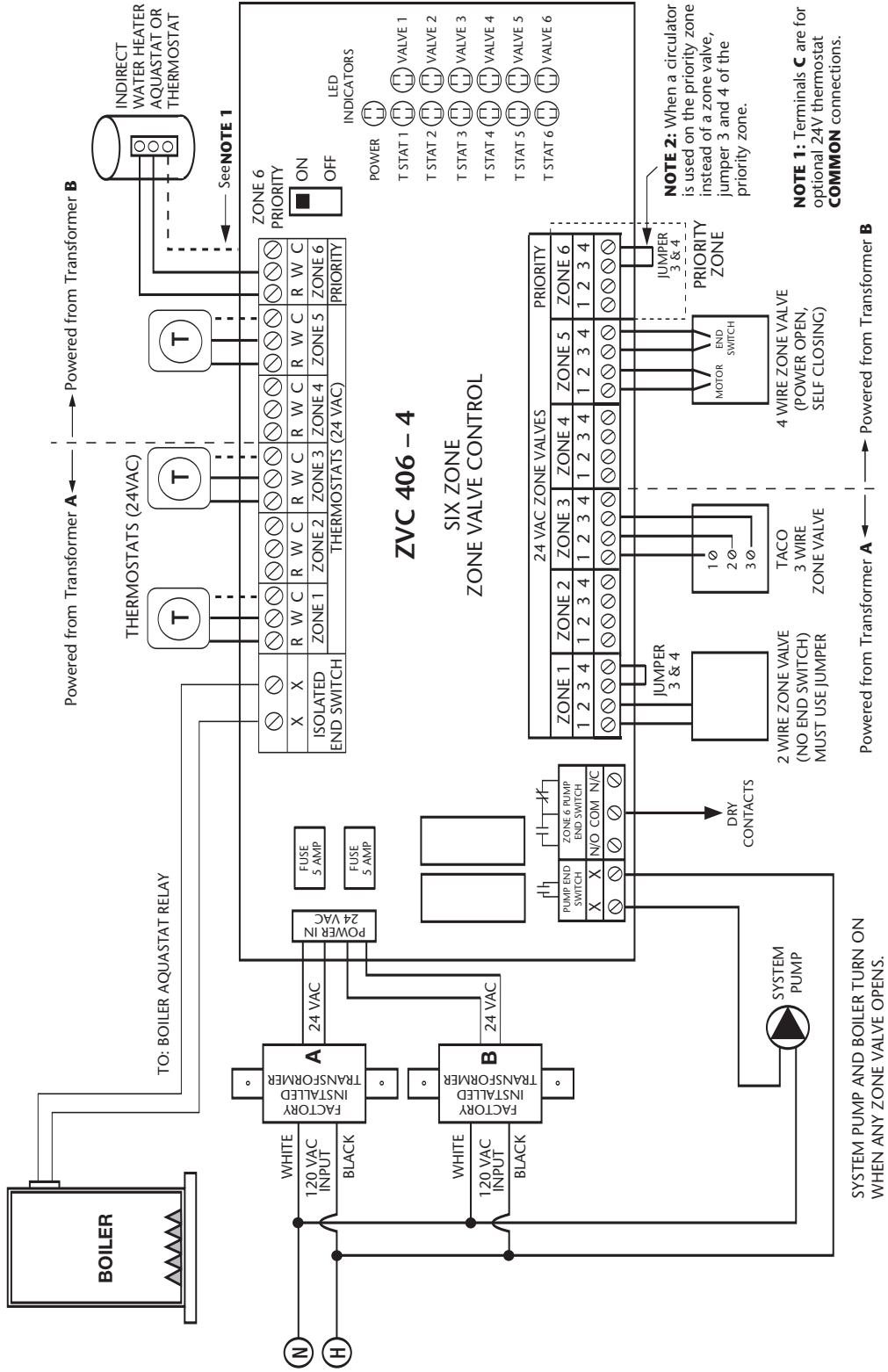
# PC700 and PC705 Controls Connected to 2 EXP Switching Relays



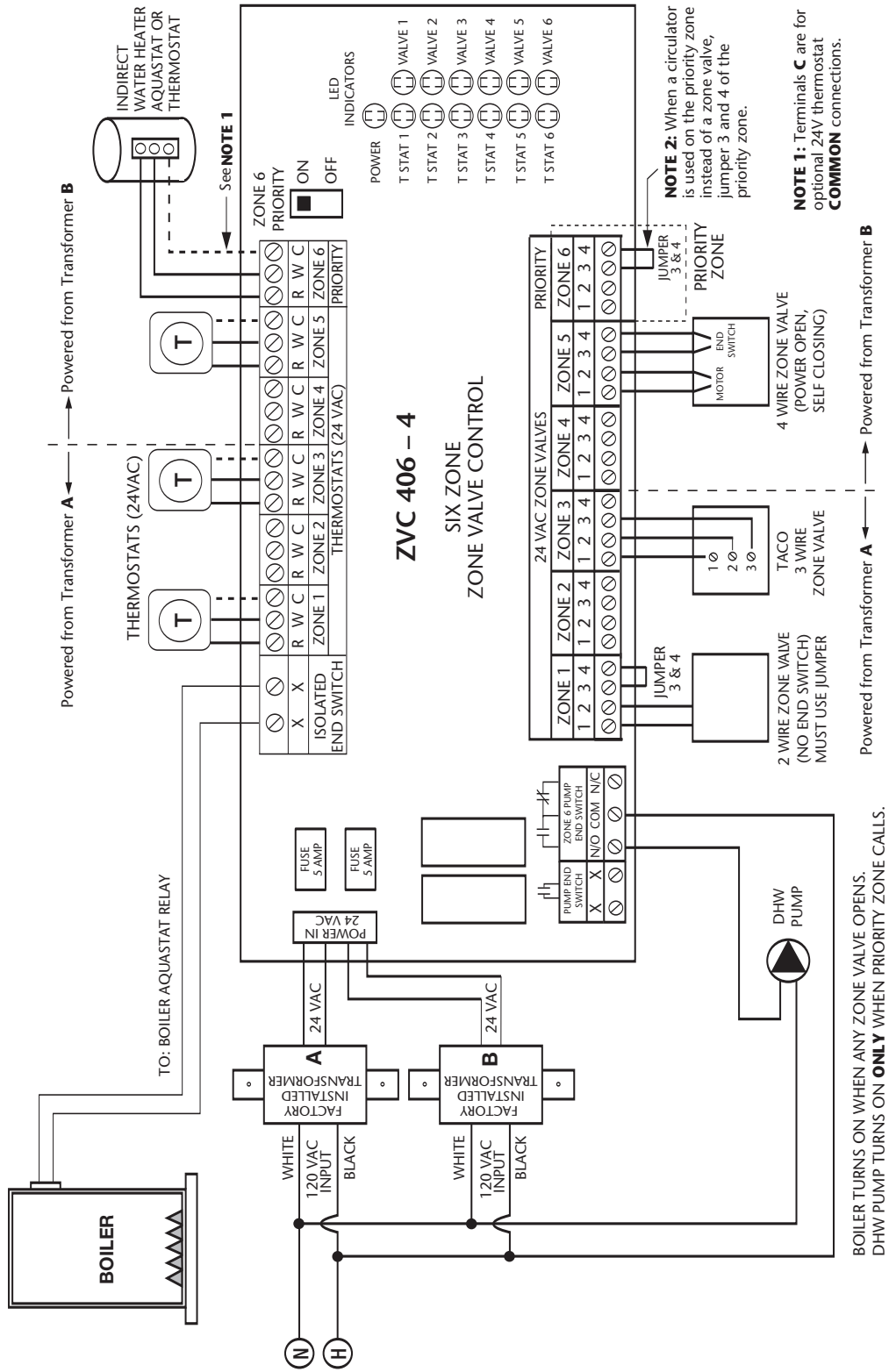
# PC702 and PC705 Controls Connected to 2 EXP Switching Relays



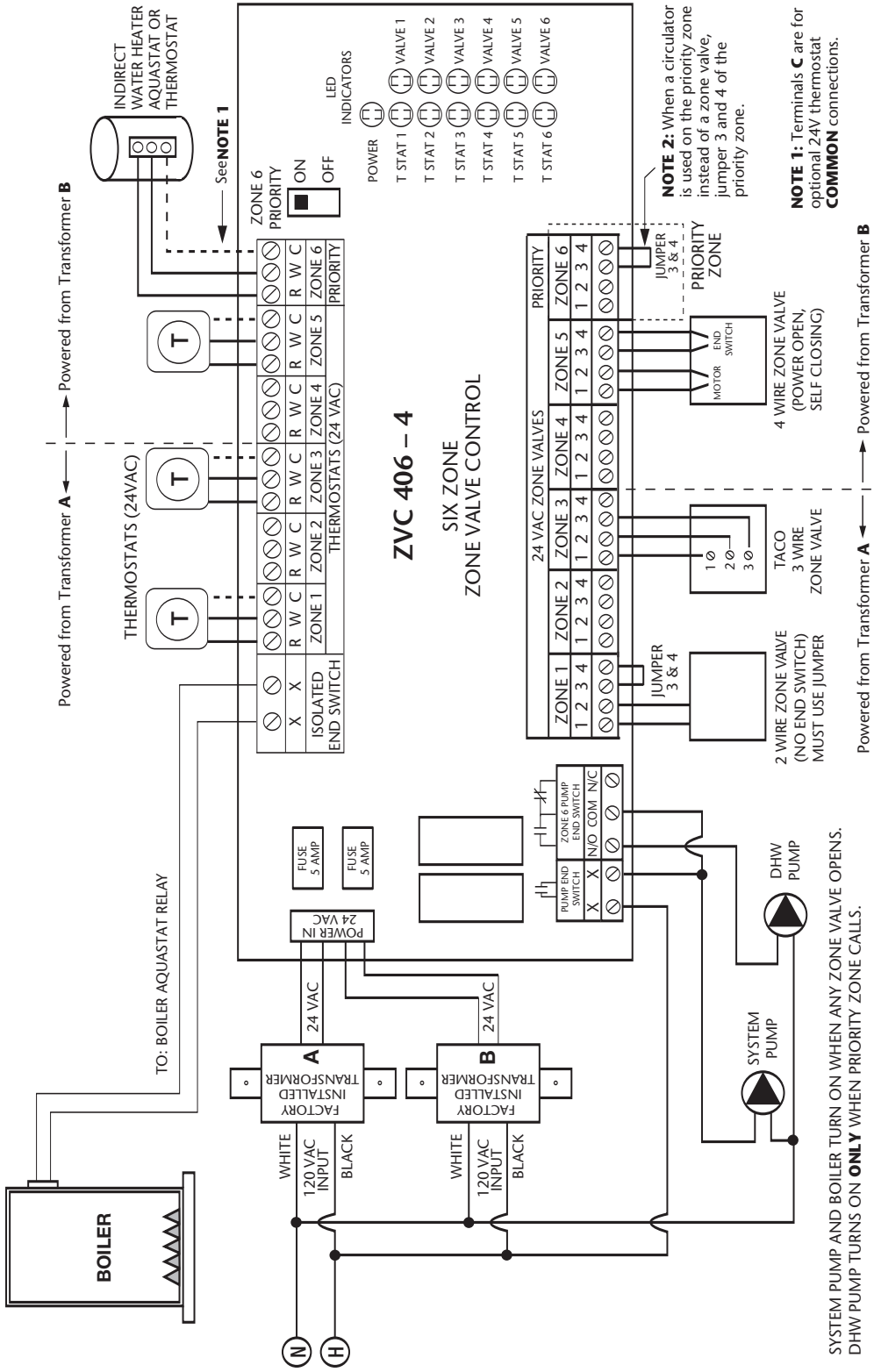
# ZVC403/404/405/406 with System Pump



# ZVC403/404/405/406 with Domestic Hot Water (DHW) Pump



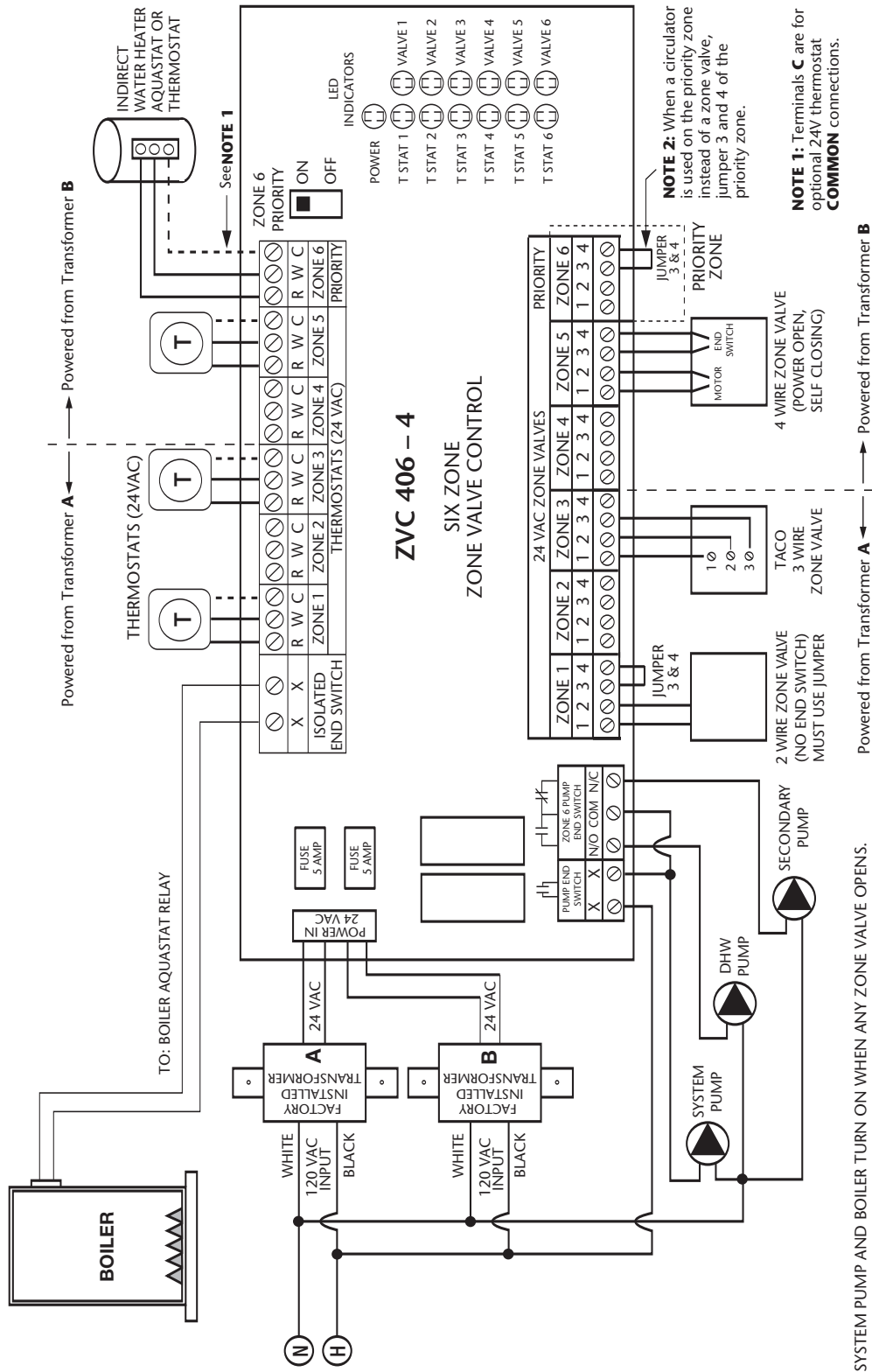
ZVC403/404/405/406 with System and DHW Pumps



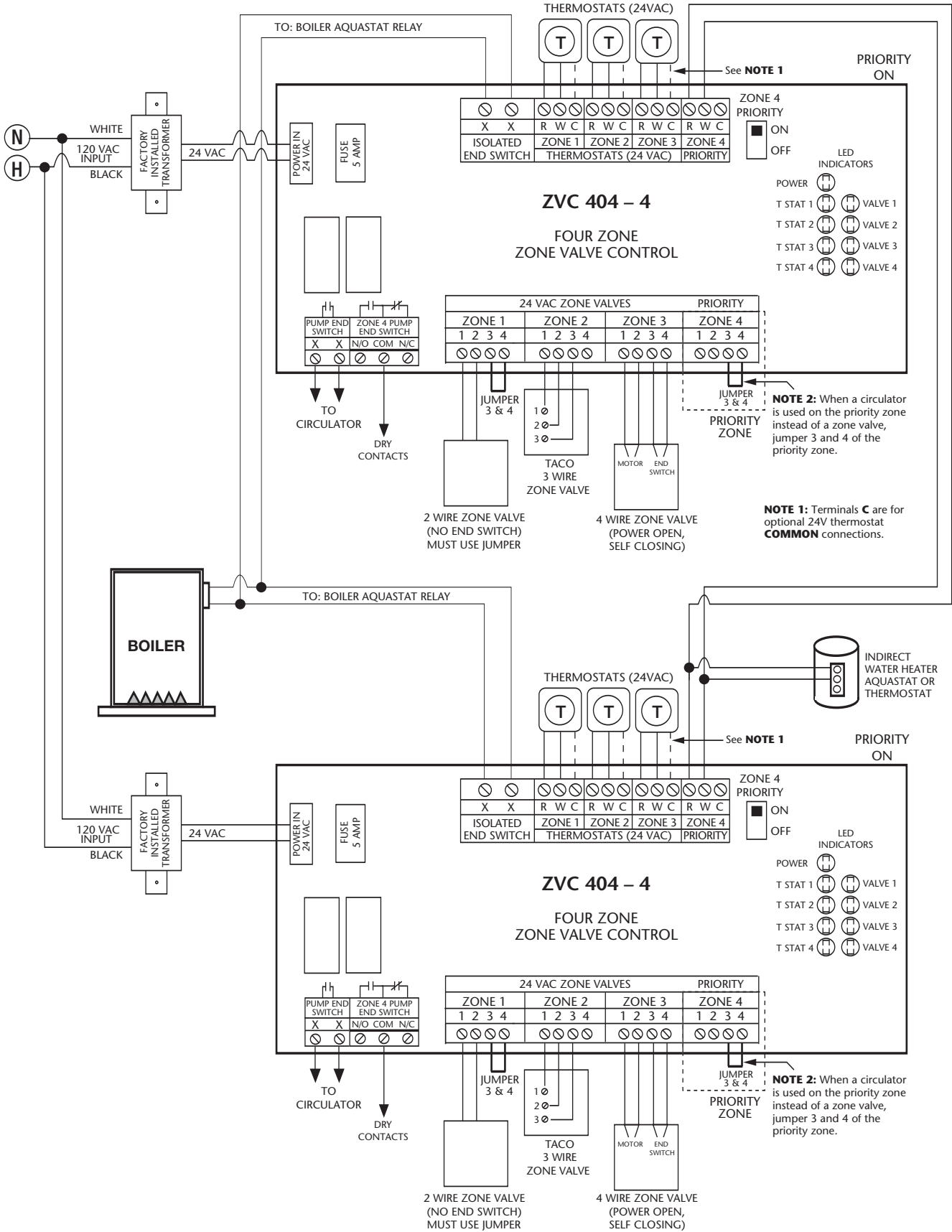
SYSTEM PUMP AND BOILER TURN ON WHEN ANY ZONE VALVE OPENS. DHW PUMP TURNS ON ONLY WHEN PRIORITY ZONE CALLS.



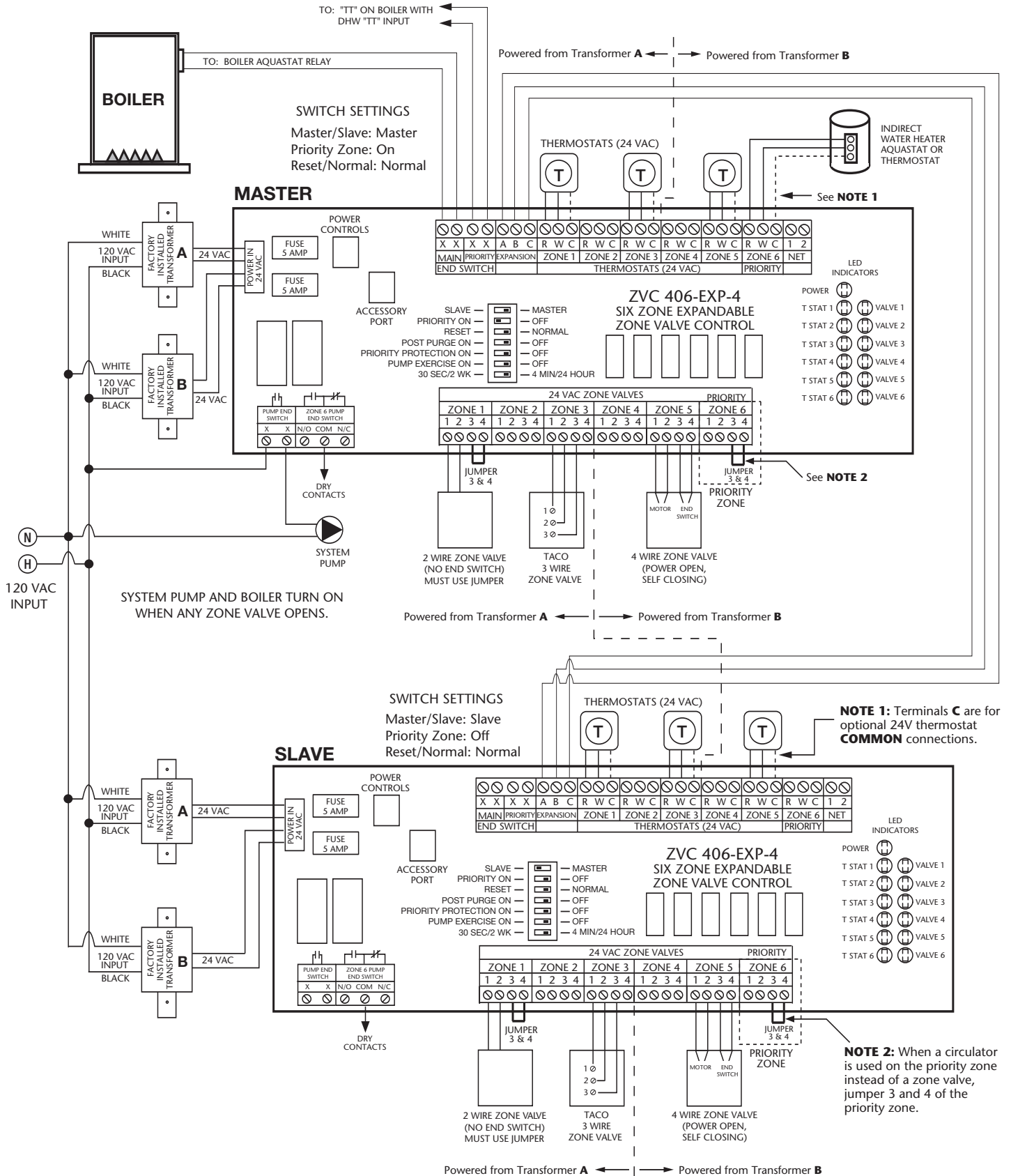
# ZVC403/404/405/406 with System, DHW and Secondary Pumps



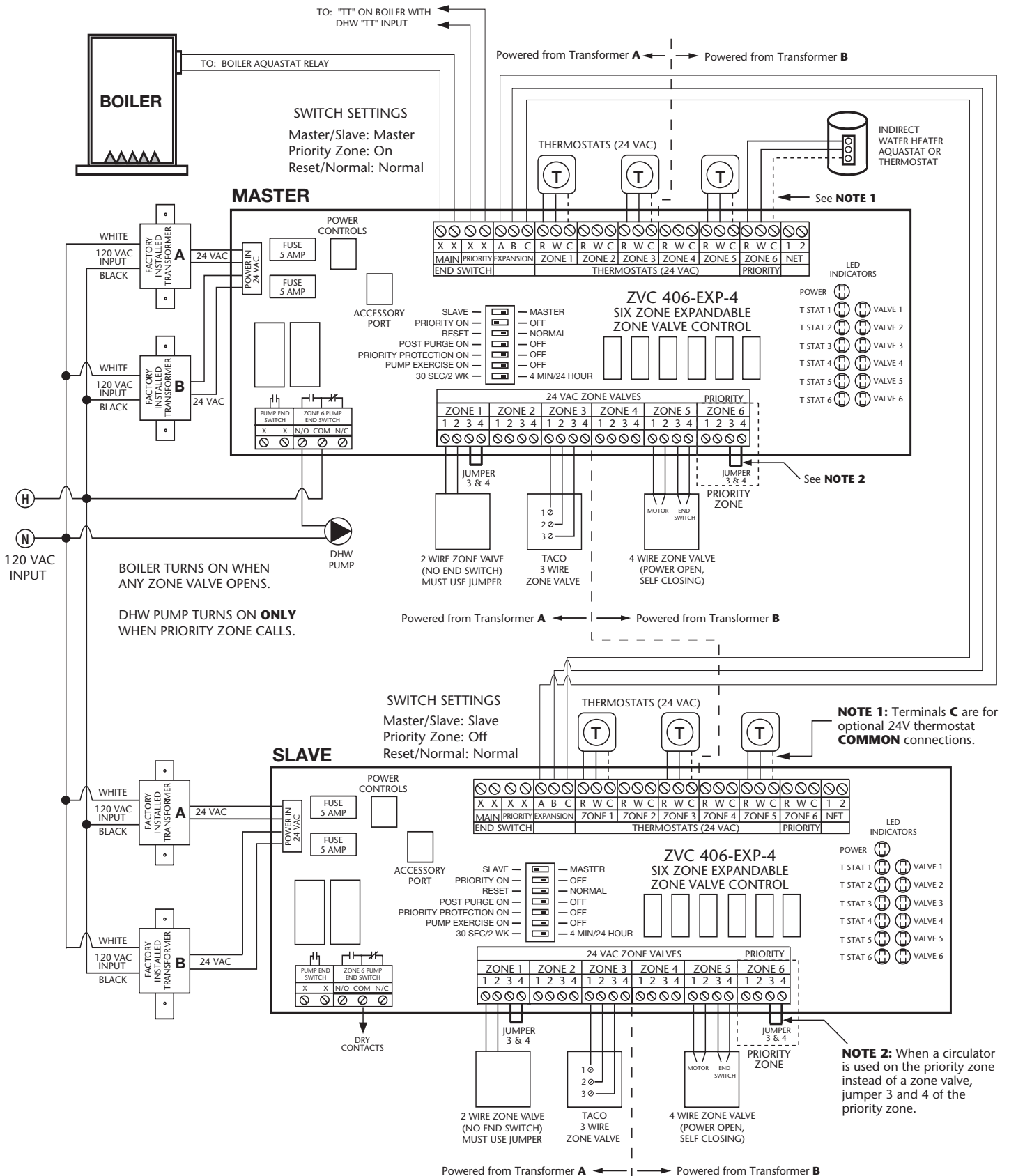
## 2 ZVC403/404/405/406 Connected Together with Priority



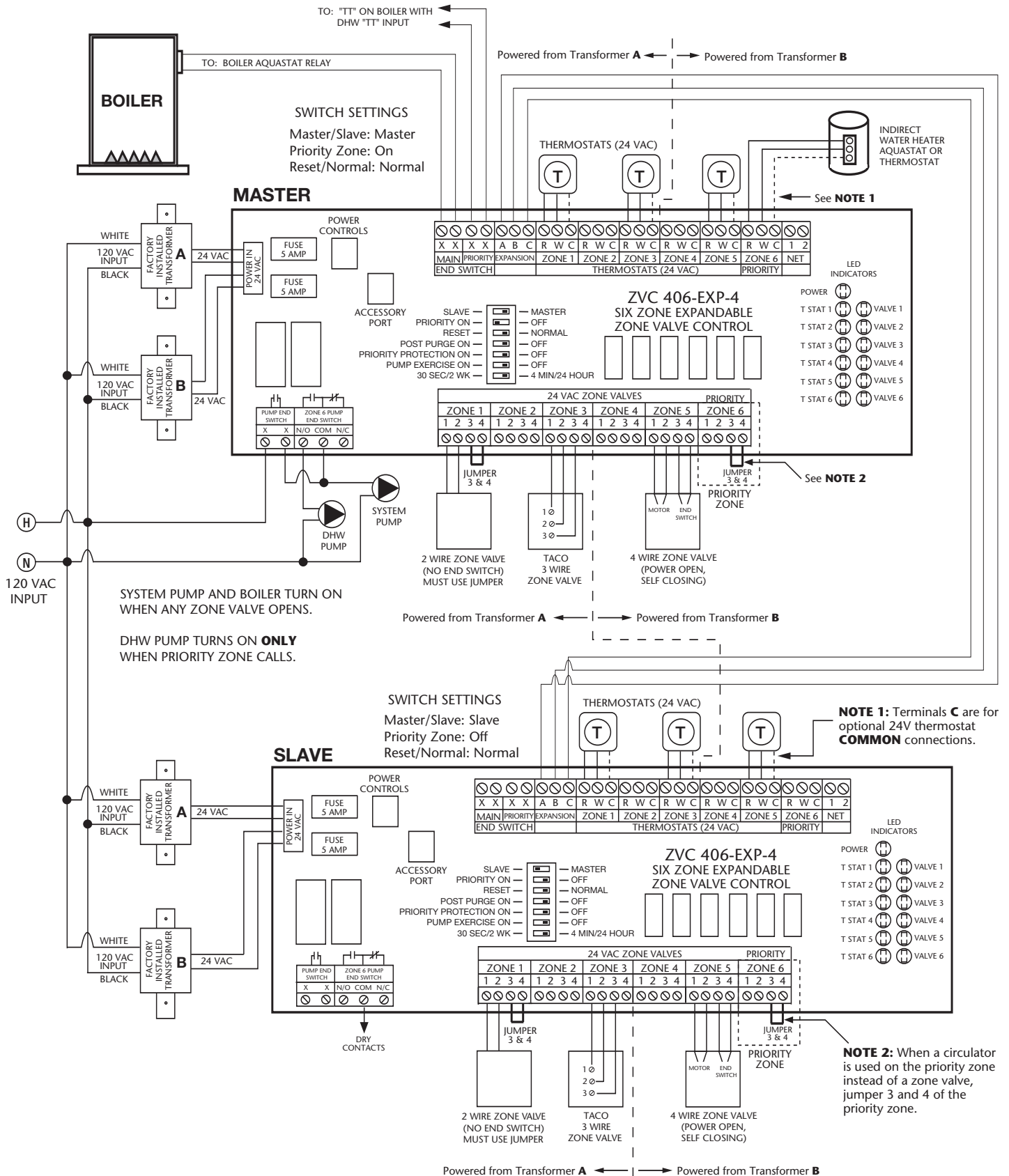
# 2 EXP Zone Valve Controls Connected Together with System Pump



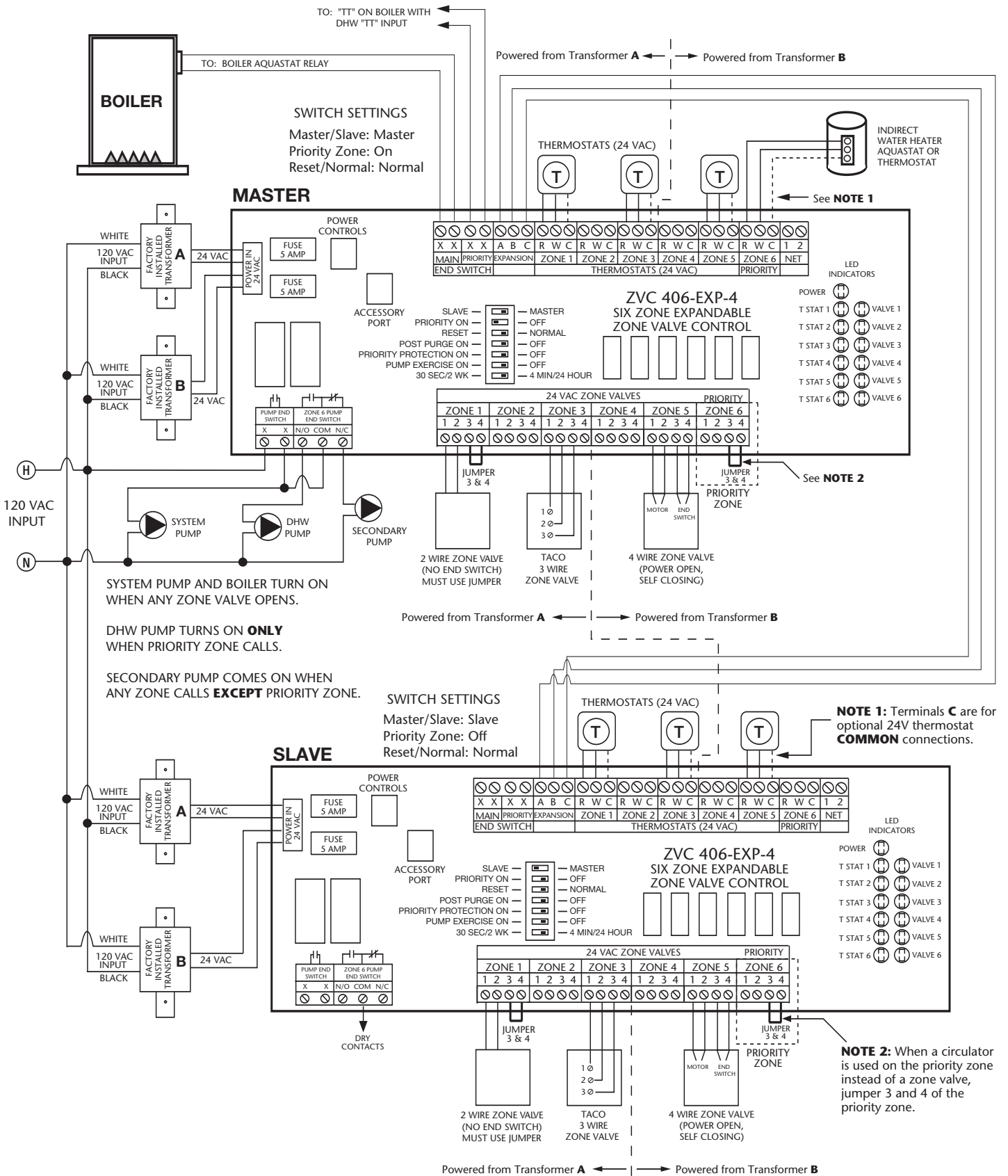
## 2 EXP Zone Valve Controls Connected Together with DHW Pump



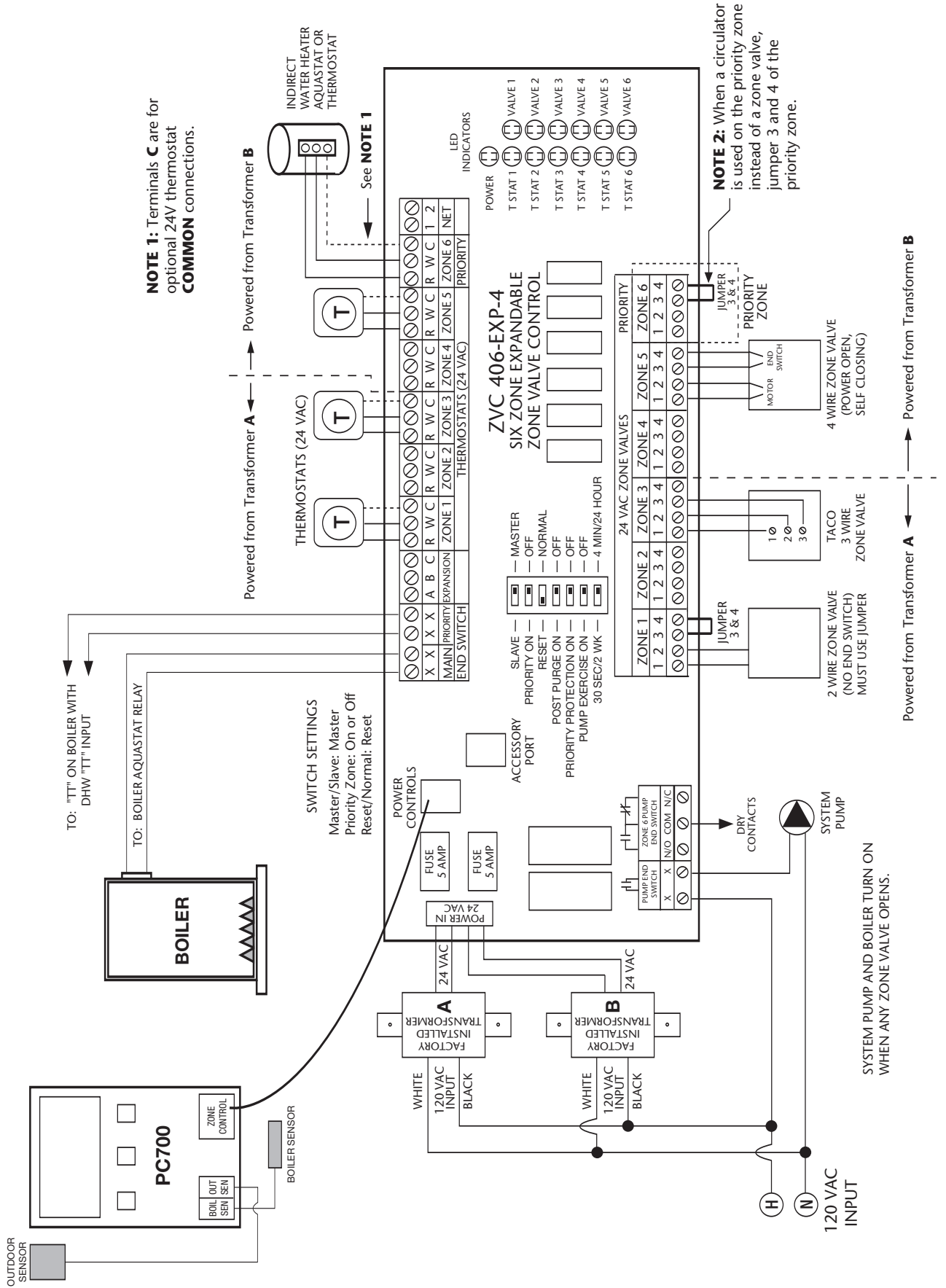
# 2 EXP Zone Valve Controls Connected Together with System and DHW Pumps



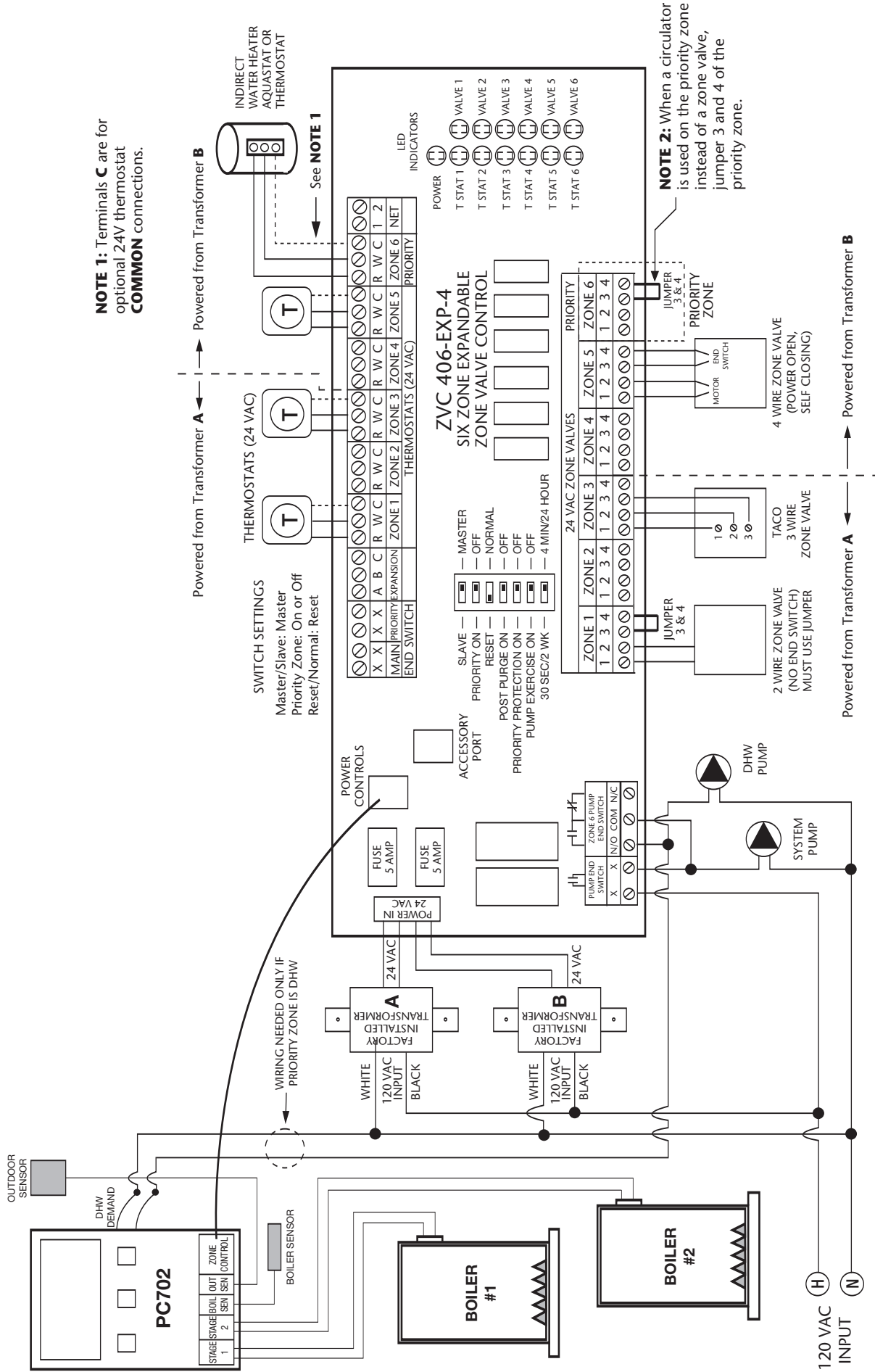
# 2 EXP Zone Valve Controls Connected Together with System, DHW and Secondary Pumps



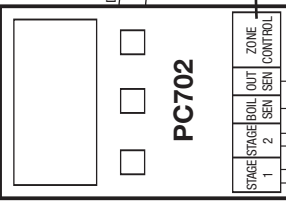
# PC700 Boiler Reset Control Connected To EXP Zone Valve Control



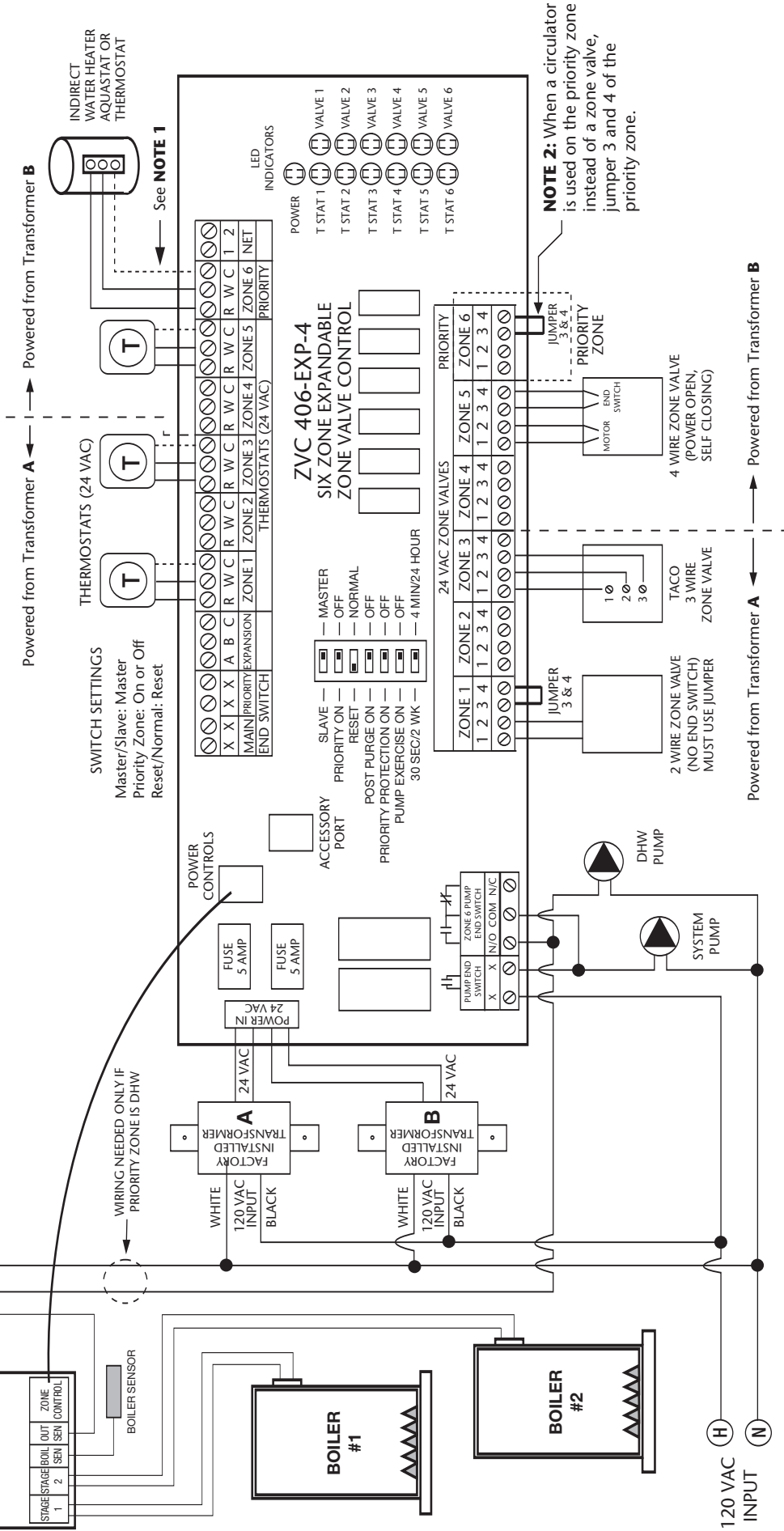
# PC702 2-Stage Boiler Reset Control Connected To EXP Zone Valve Control



OUTDOOR SENSOR



**NOTE 1:** Terminals **C** are for optional 24V thermostat common connections.

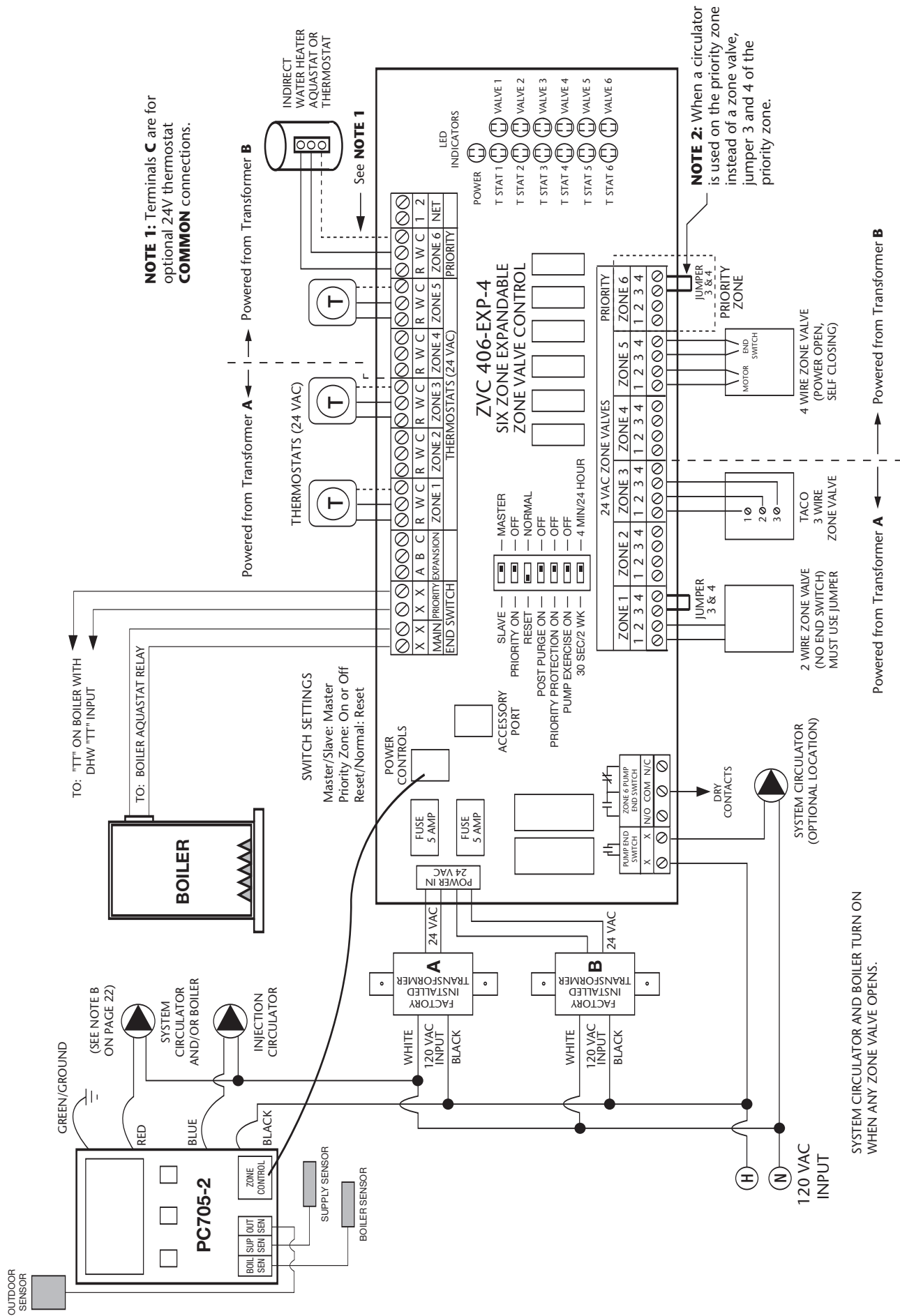


**NOTE 2:** When a circulator is used on the priority zone instead of a zone valve, jumper 3 and 4 of the priority zone.

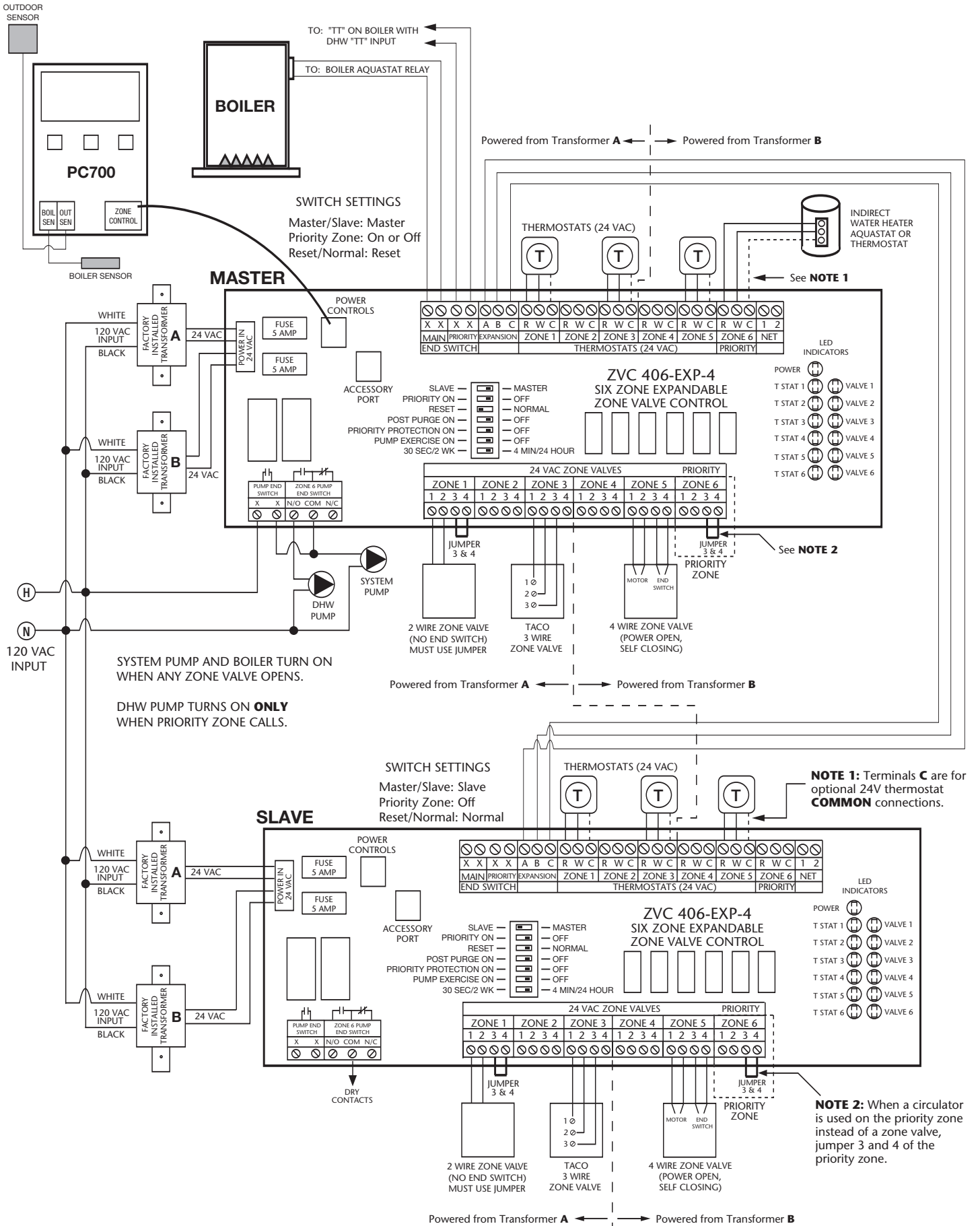
SYSTEM PUMP AND BOILER TURN ON WHEN ANY ZONE VALVE OPENS. DHW CIRCULATOR TURNS ON ONLY WHEN PRIORITY ZONE CALLS.



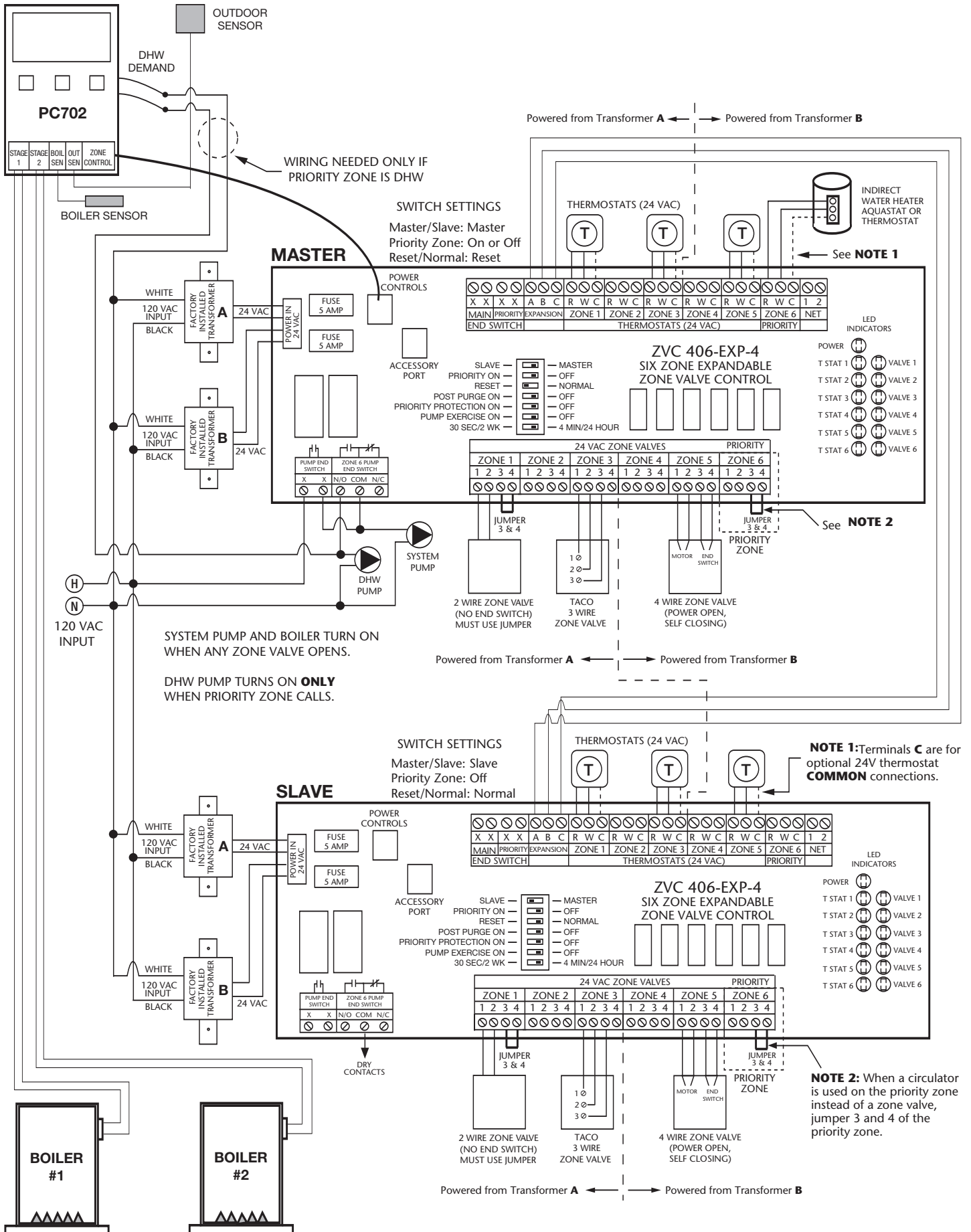
# PC705 Variable Speed Pump Injection Control Connected To EXP Zone Valve Control



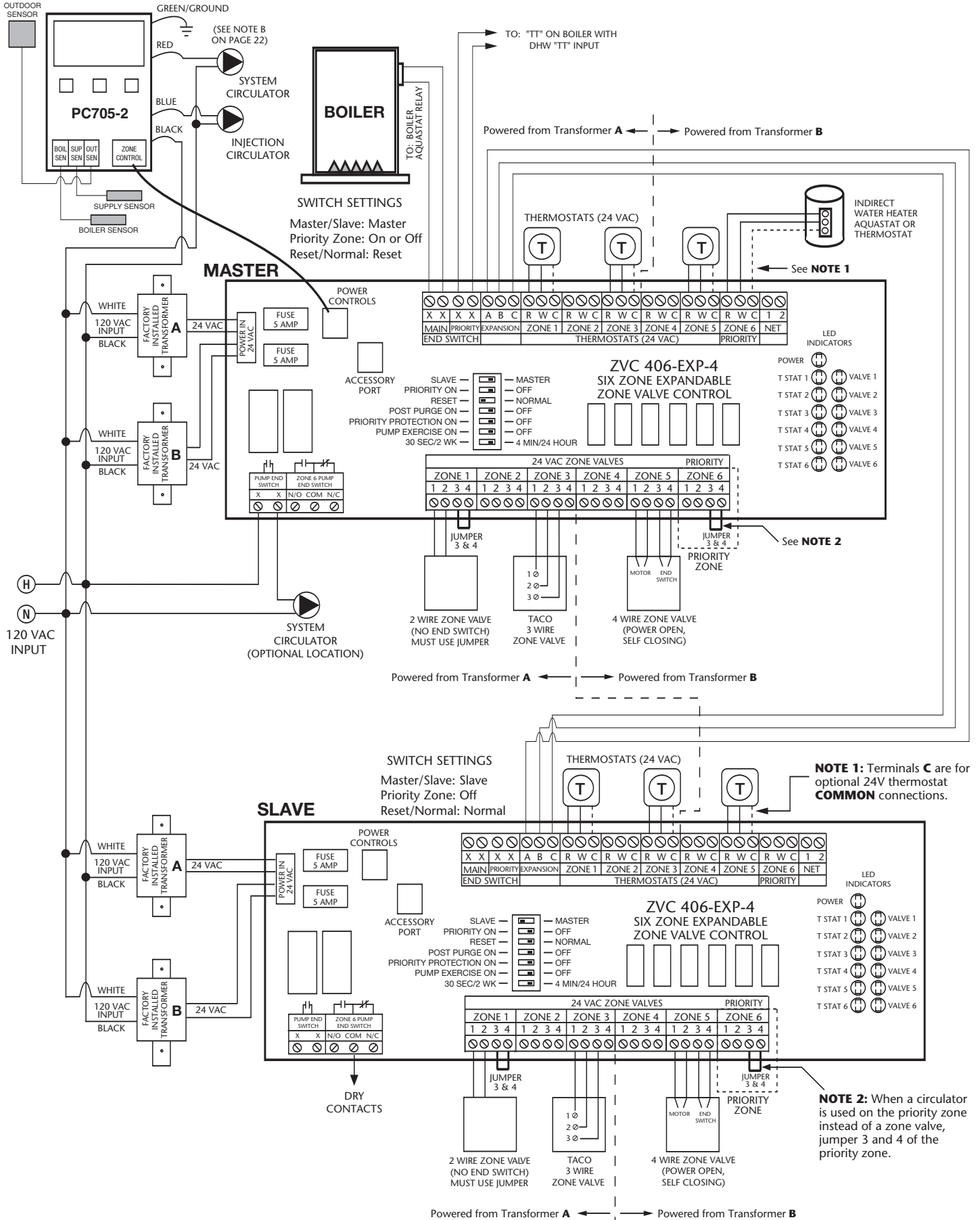
# PC700 Boiler Reset Control Connected To 2 EXP Zone Valve Controls



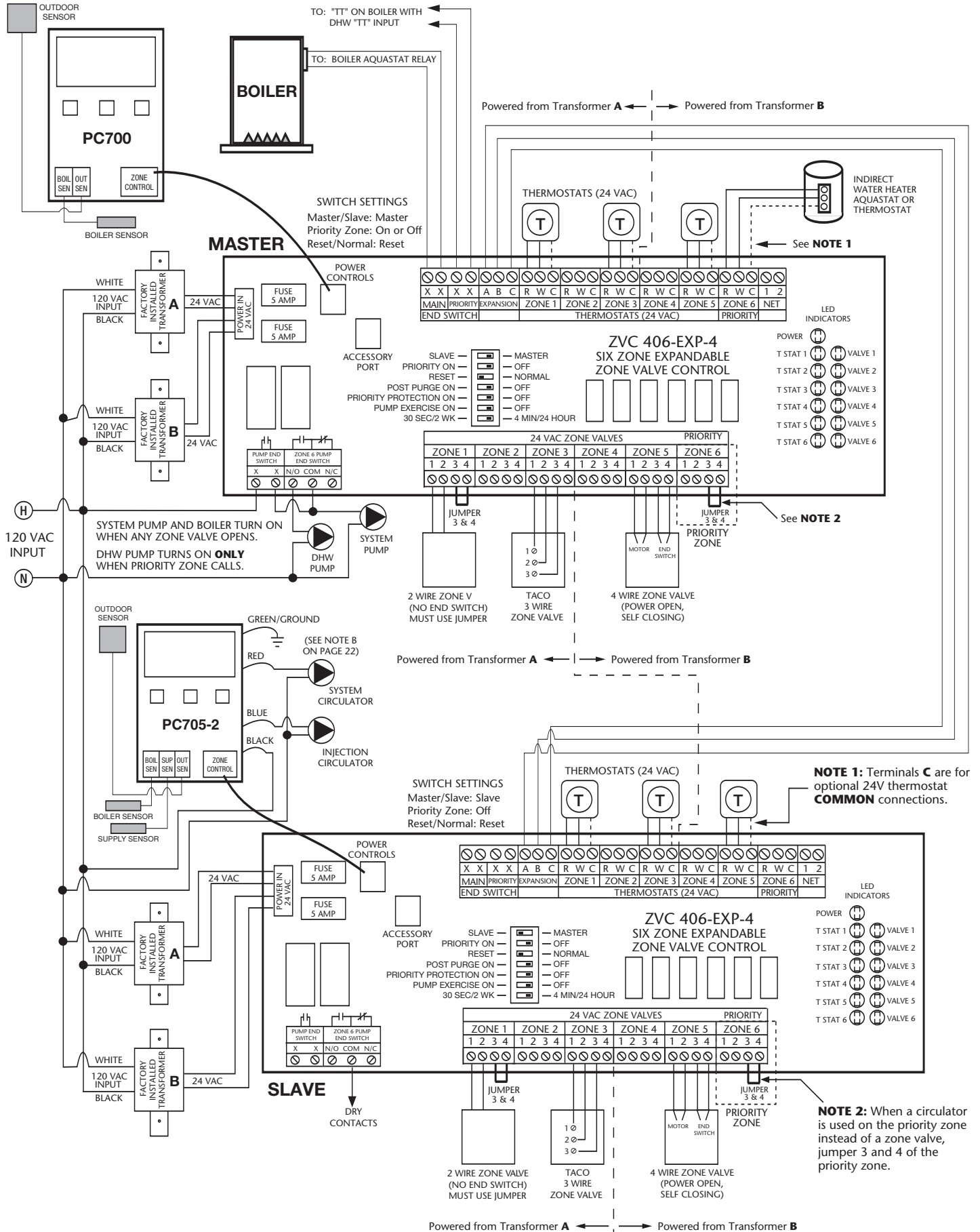
# PC702 2-Stage Boiler Reset Control Connected To 2 EXP Zone Valve Controls



# PC705 Variable Speed Pump Injection Control Connected To 2 EXP Zone Valve Controls



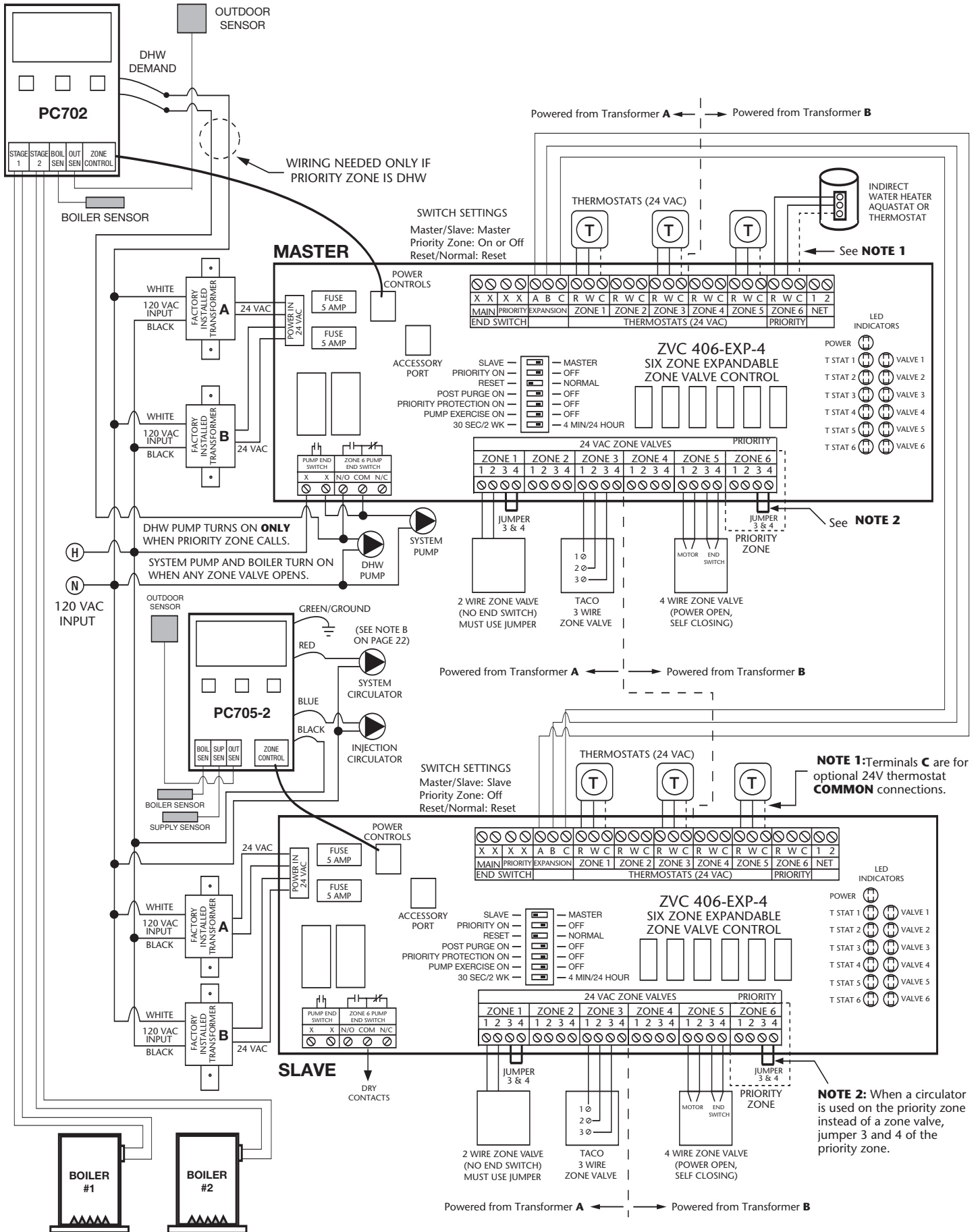
# PC700 and PC705 Connected To 2 EXP Zone Valve Controls



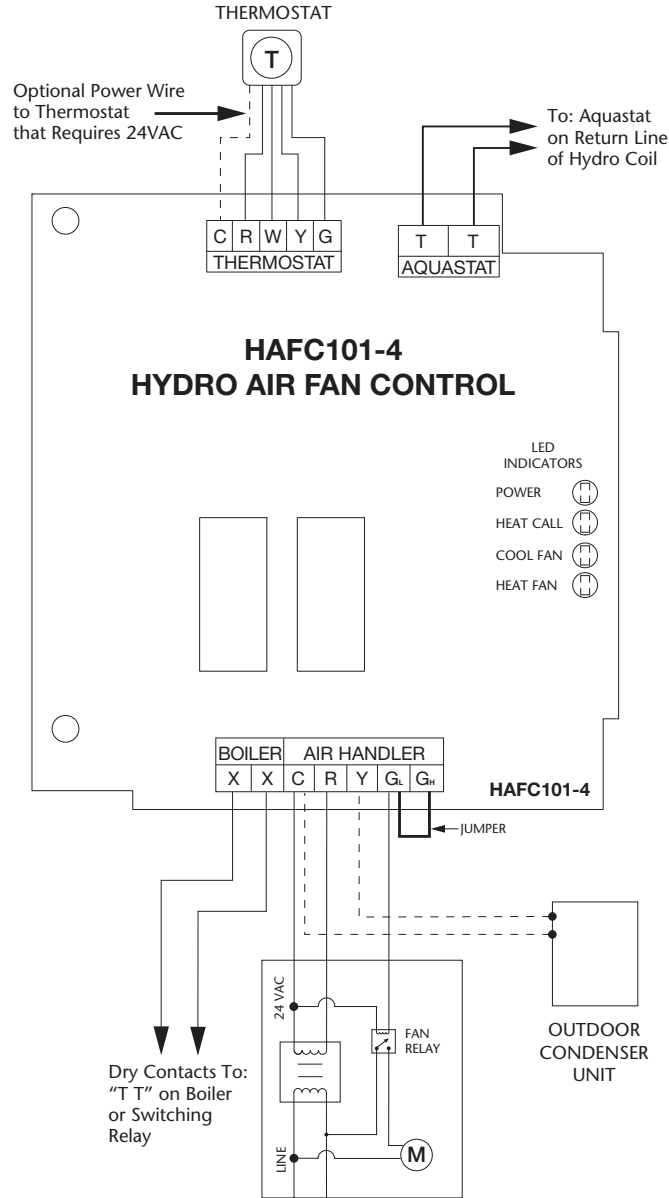
**NOTE 1:** Terminals C are for optional 24V thermostat COMMON connections.

**NOTE 2:** When a circulator is used on the priority zone instead of a zone valve, jumper 3 and 4 of the priority zone.

# PC702 and PC705 Connected To 2 EXP Zone Valve Controls



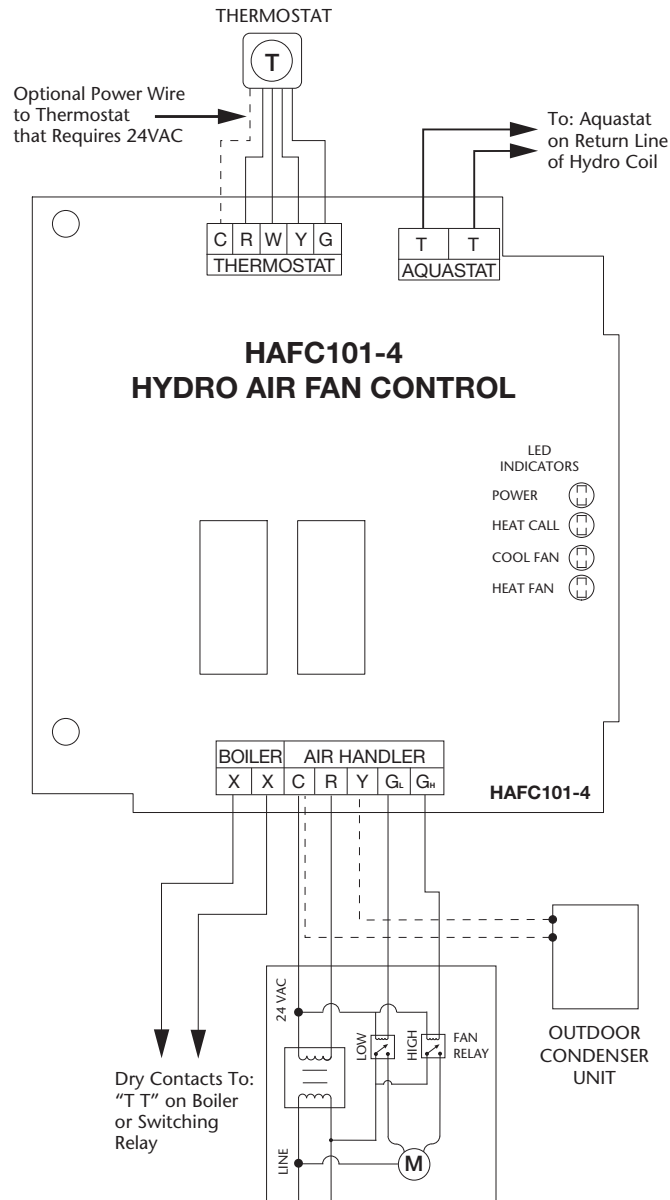
# H AFC101-4 with 1 Speed Air Handler



## H AFC 101 WITH 1 SPEED AIR HANDLER

(Both HFC 101 and H AFC 201 are capable of 1 and 2 speed applications.)

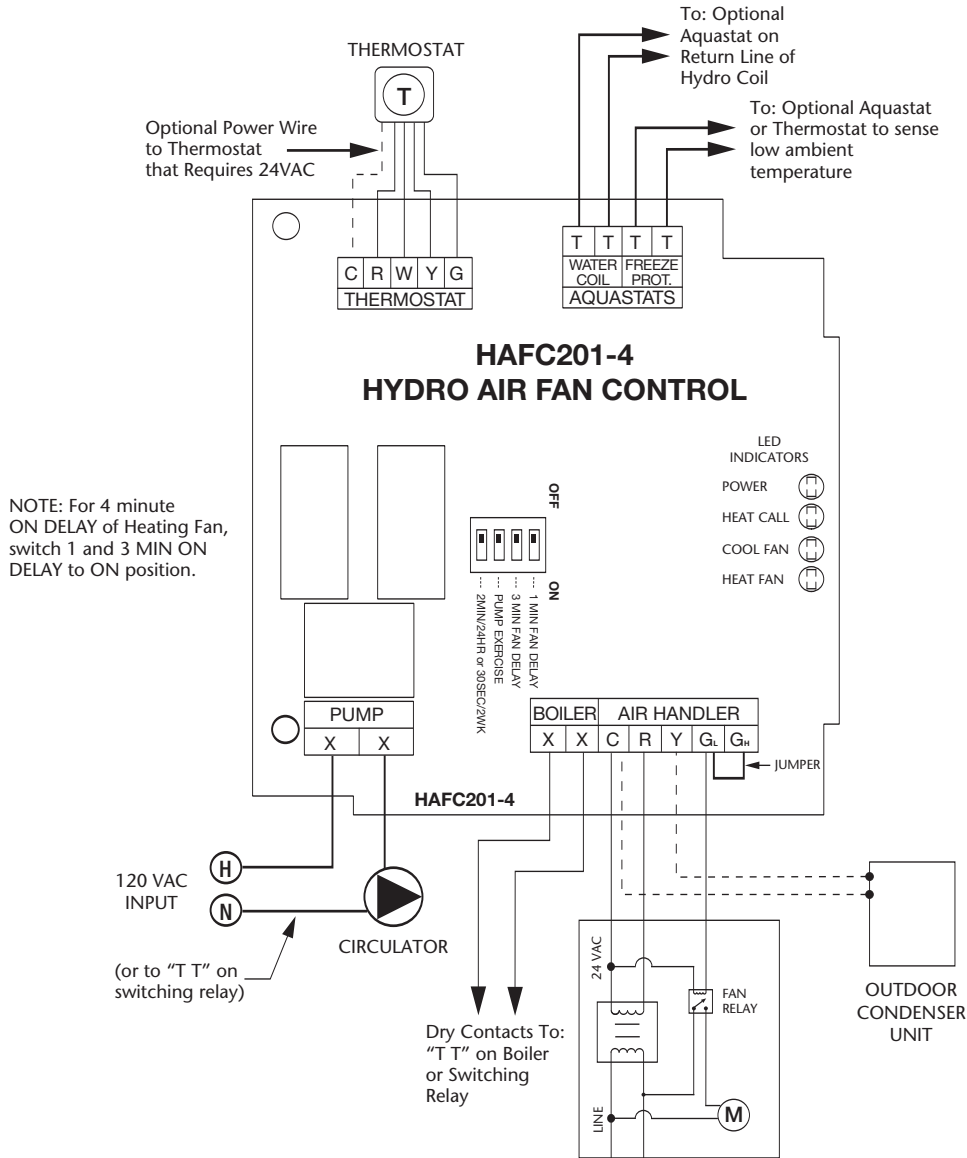
# H AFC101-4 with 2 Speed Air Handler



**H AFC 101 WITH 2 SPEED AIR HANDLER**  
(Both HFC 101 and H AFC 201 are  
capable of 1 and 2 speed applications.)

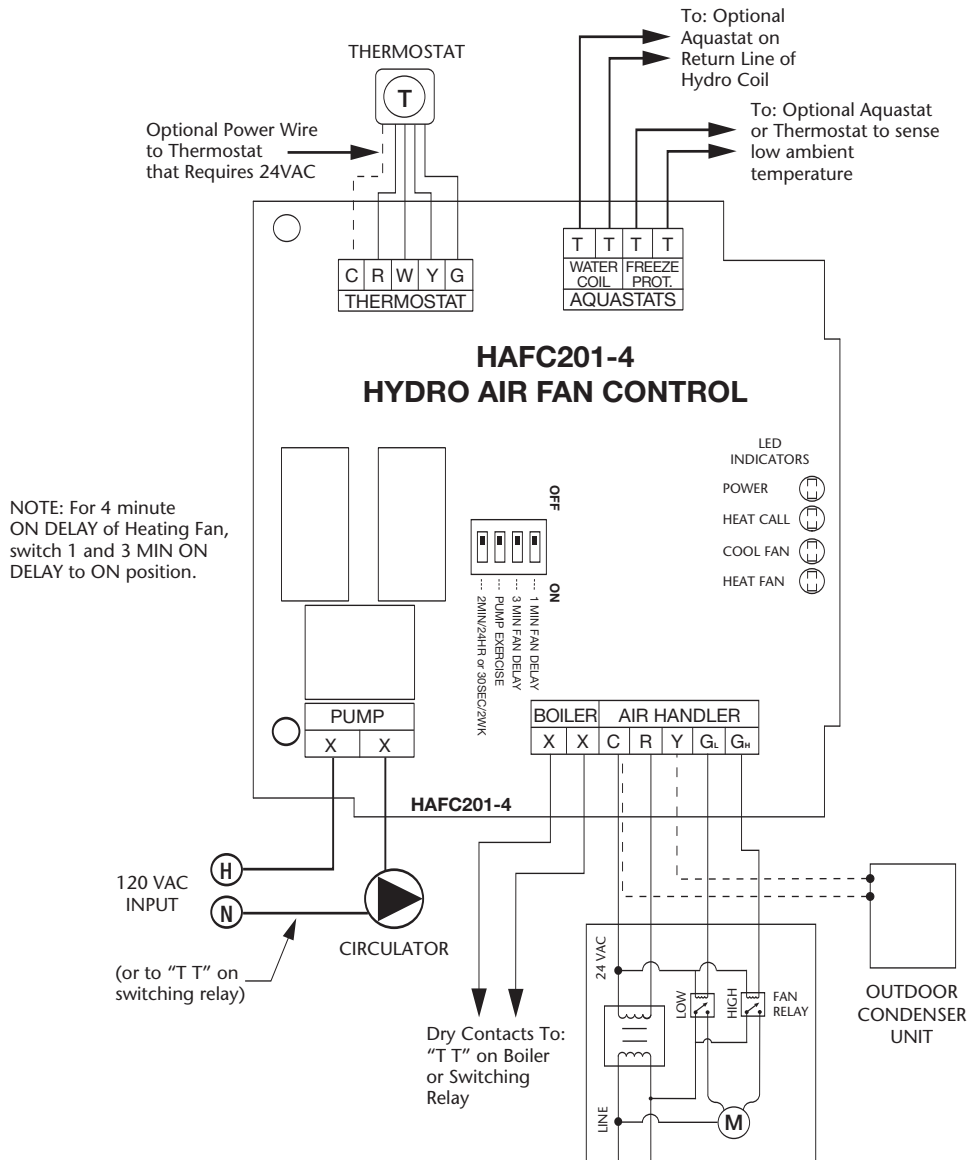


# H AFC201-4 with 1 Speed Air Handler



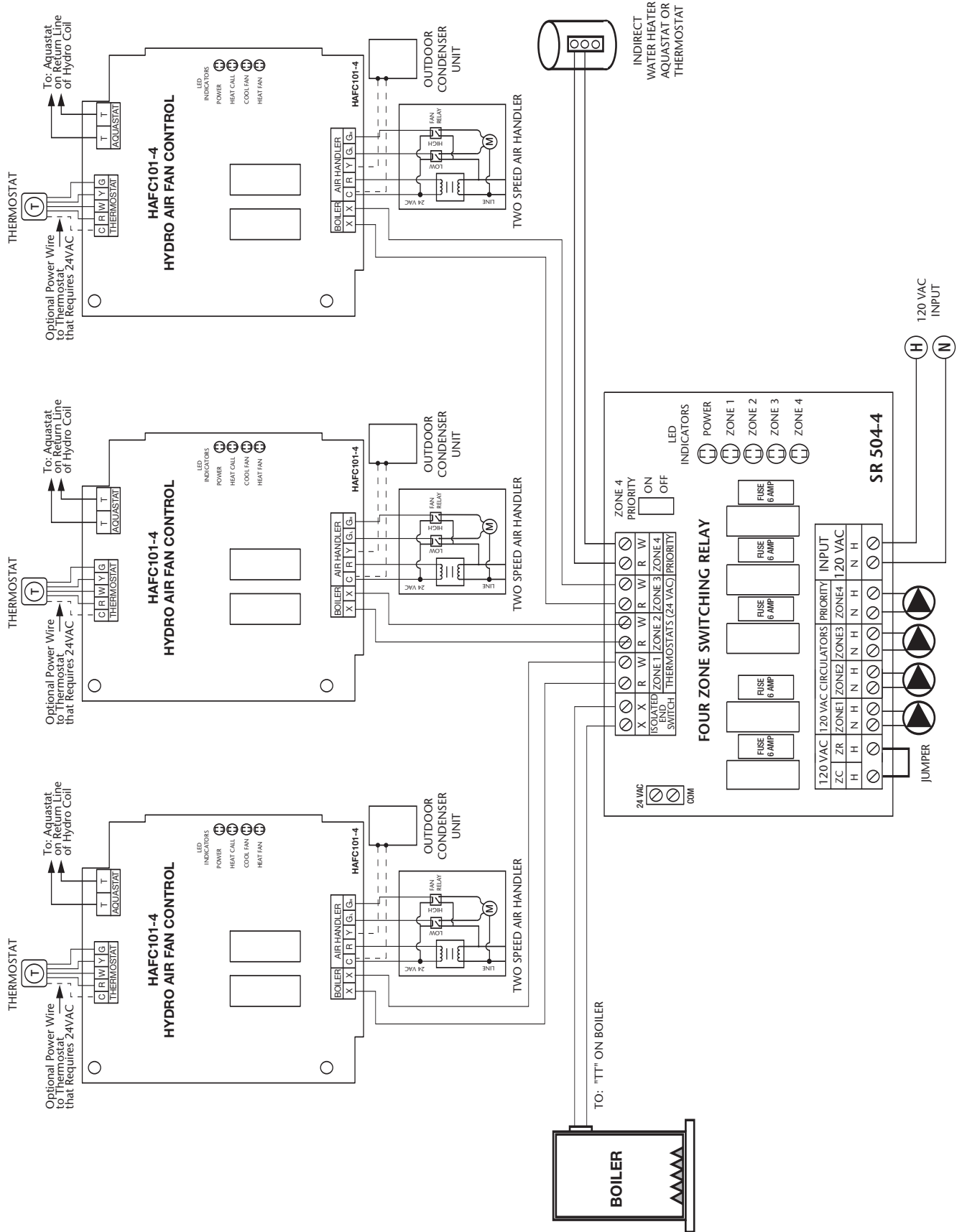
**H AFC 201 WITH 1 SPEED AIR HANDLER**  
 (Both HFC 101 and H AFC 201 are capable of 1 and 2 speed applications.)

# H AFC201-4 with 2 Speed Air Handler

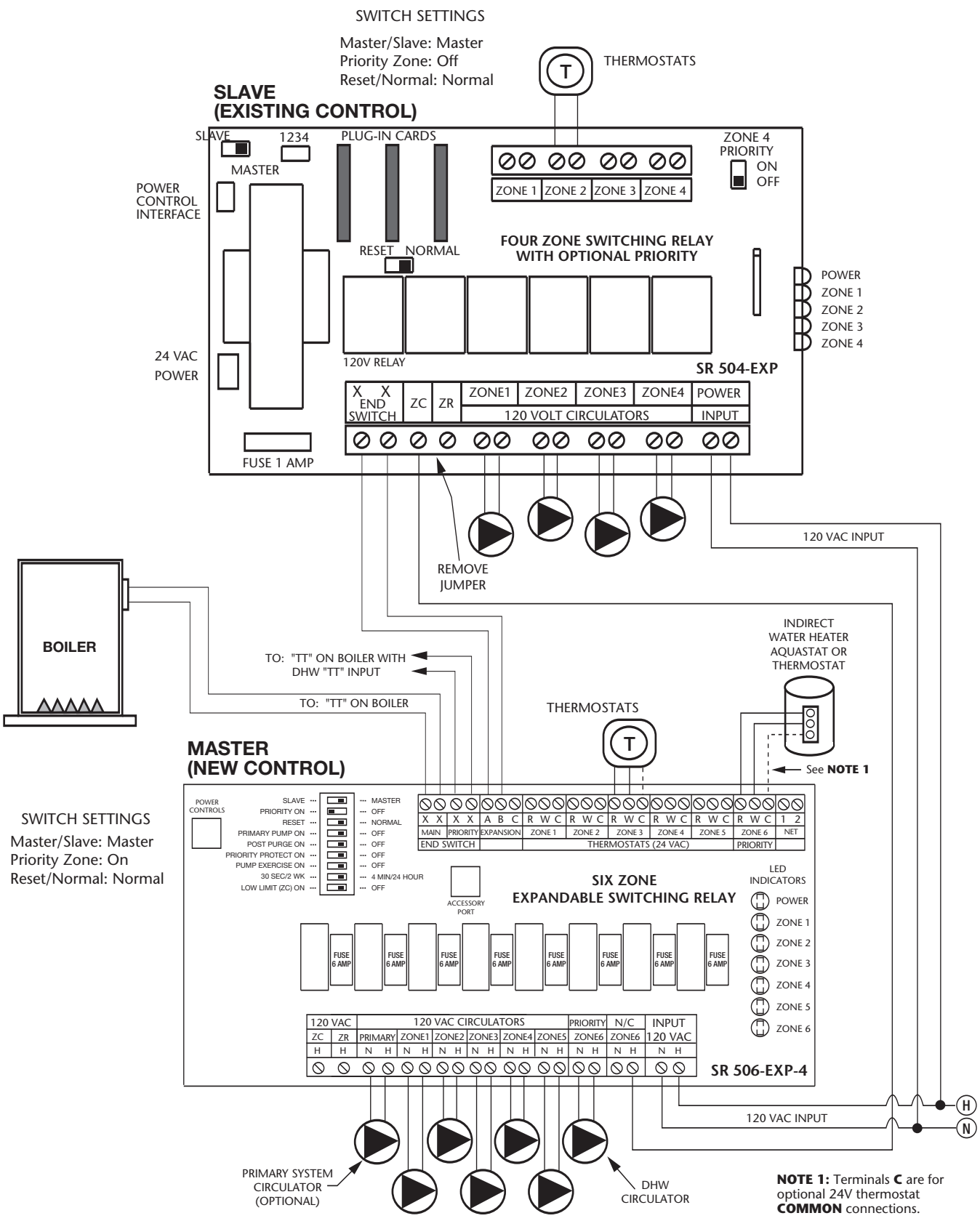


**H AFC 201 WITH 2 SPEED AIR HANDLER**  
 (Both HFC 101 and H AFC 201 are capable of 1 and 2 speed applications.)

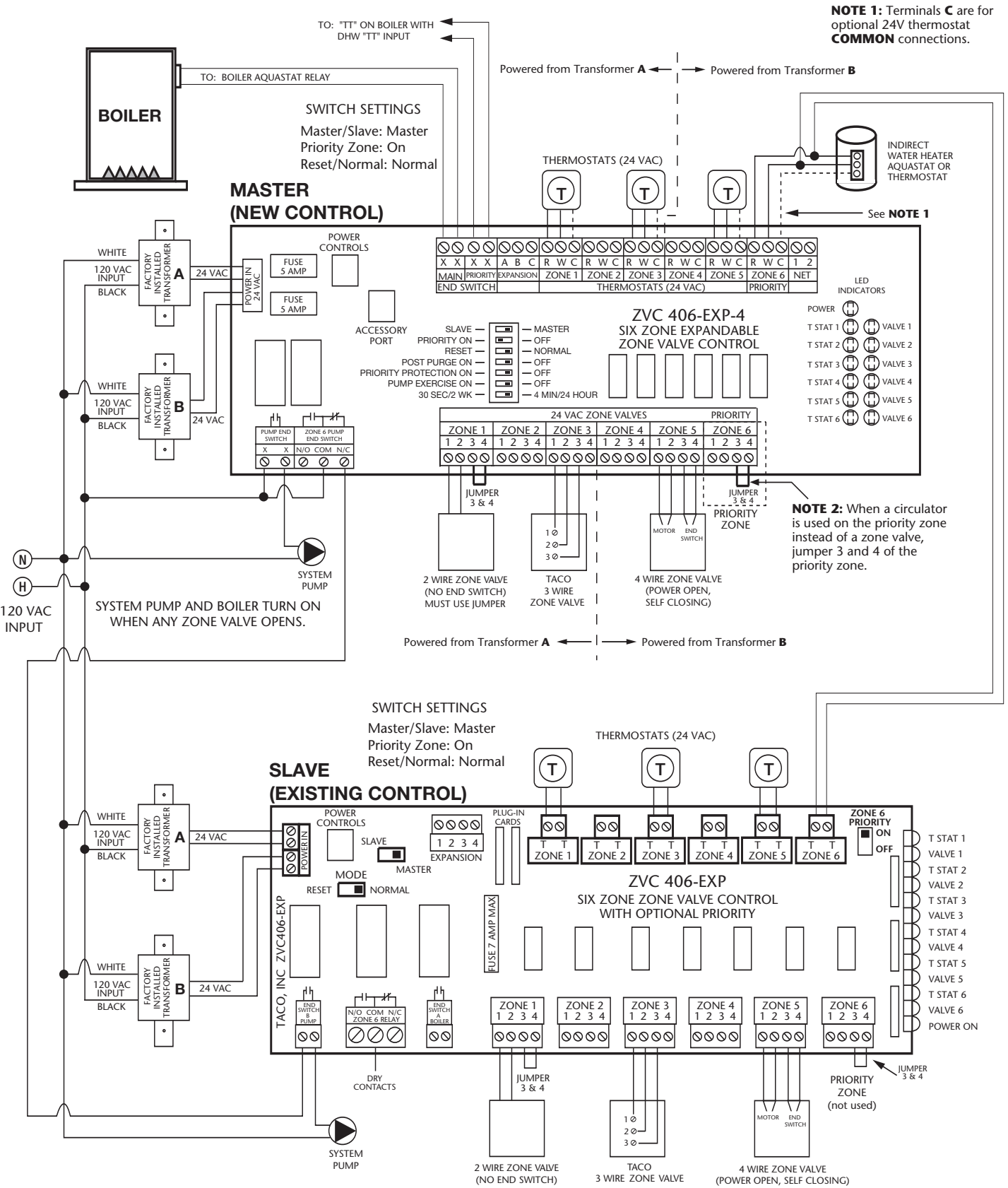
# Multiple HAFc's and Switching Relay



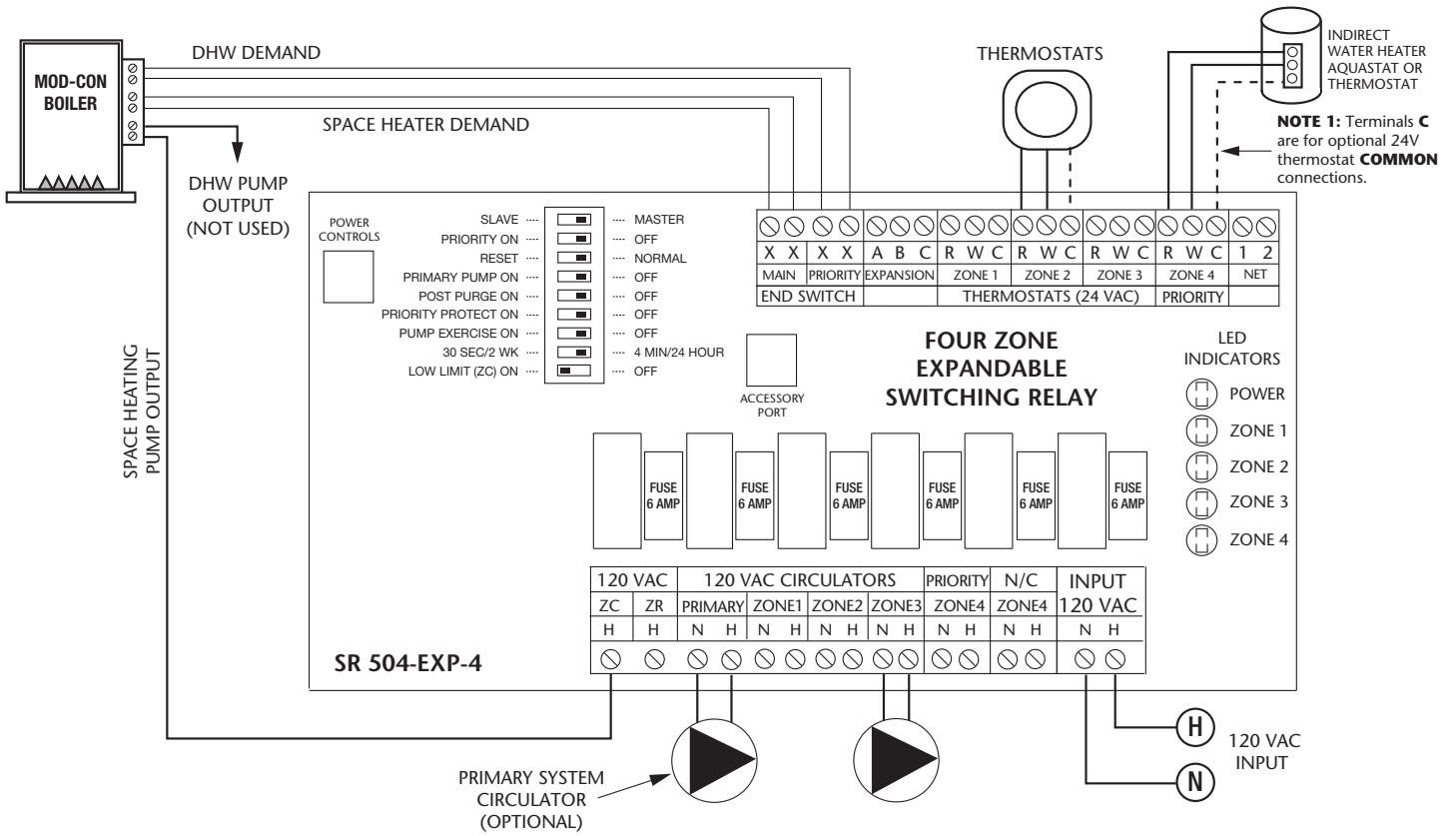
# New Expandable Switching Relay Connected to an Older Expandable Switching Relay



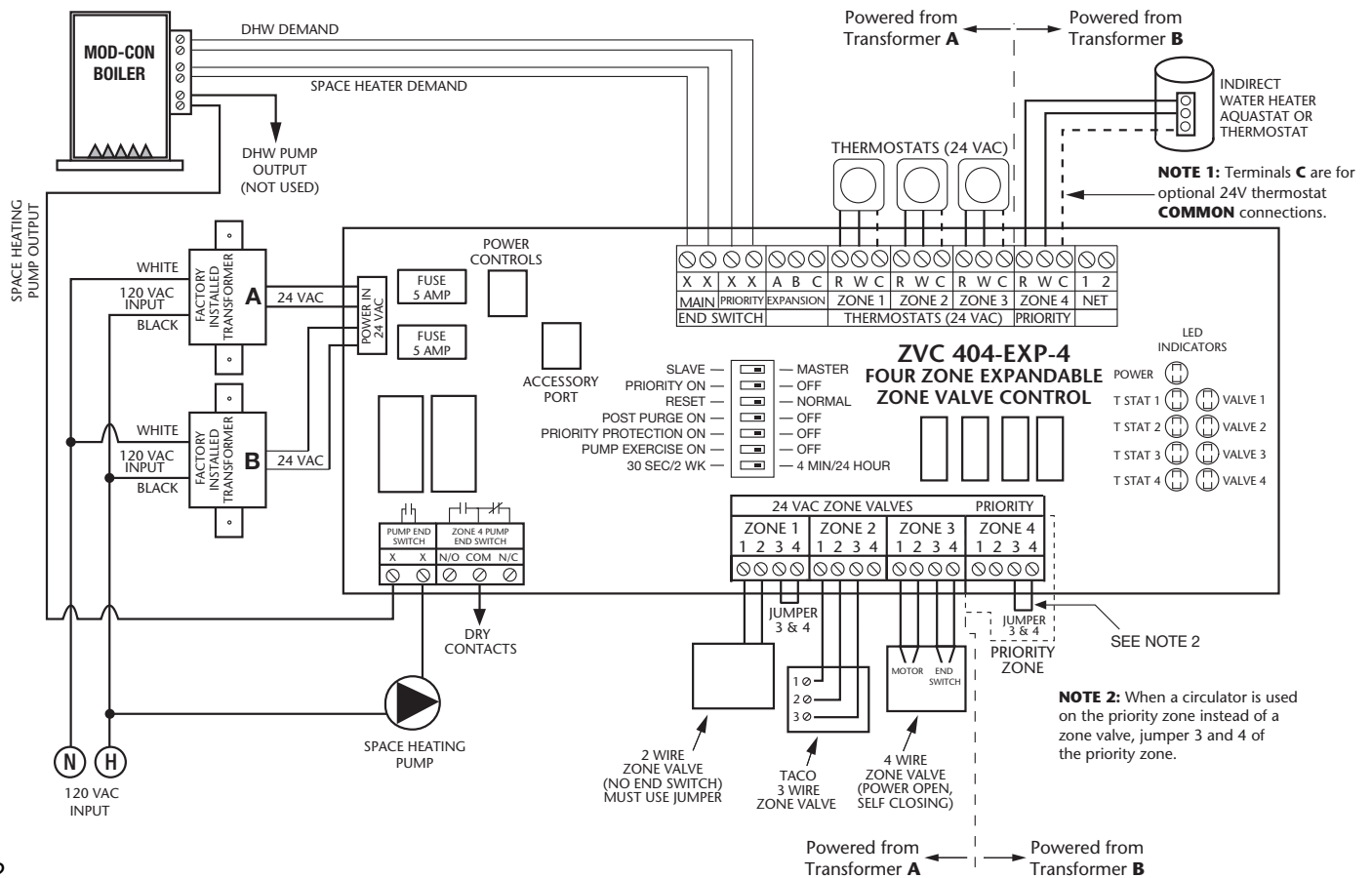
# New Expandable Zone Valve Control Connected to an Older Expandable Zone Valve Control



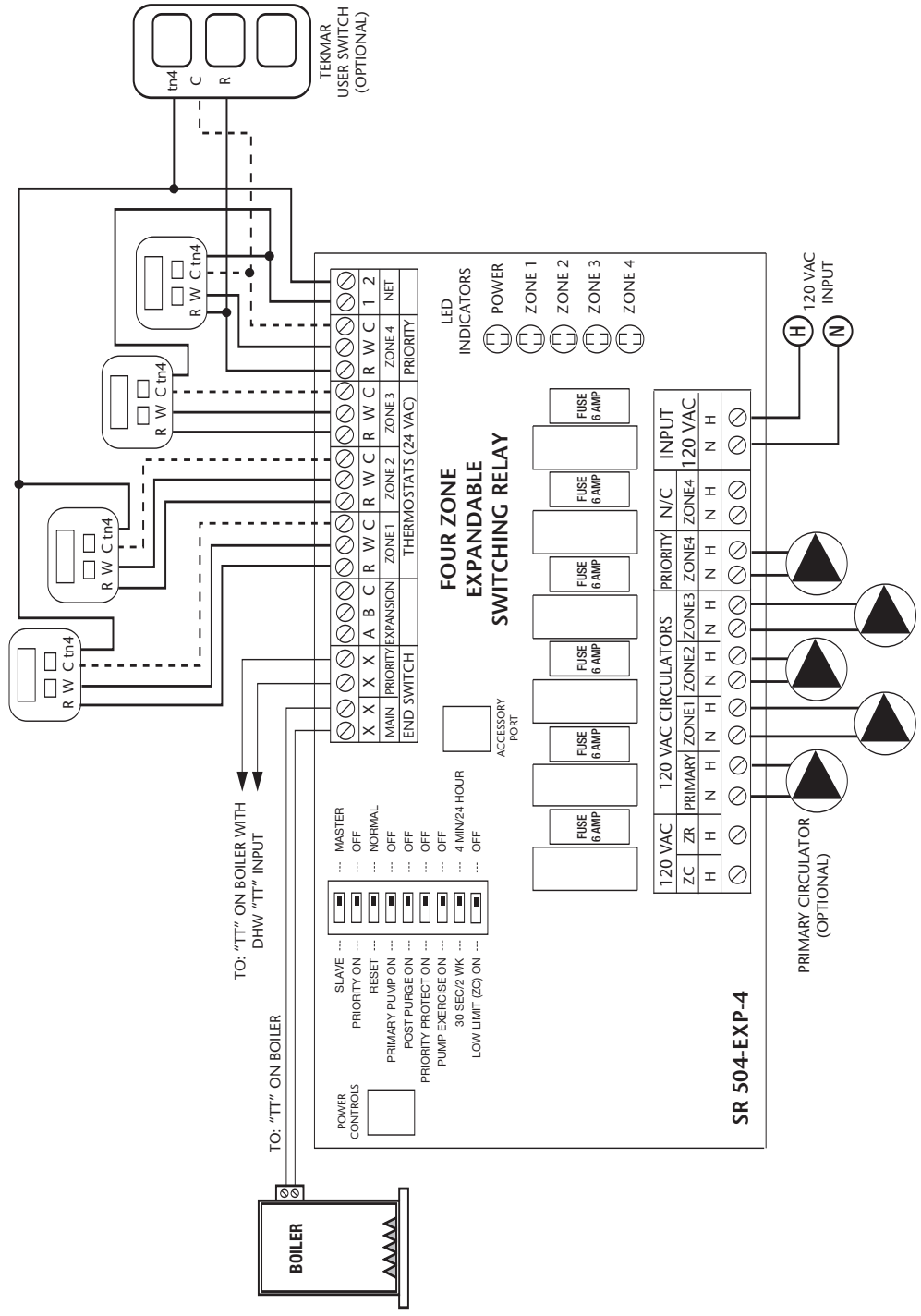
# SR504-EXP Switching Relay Connected to a MOD-CON Boiler



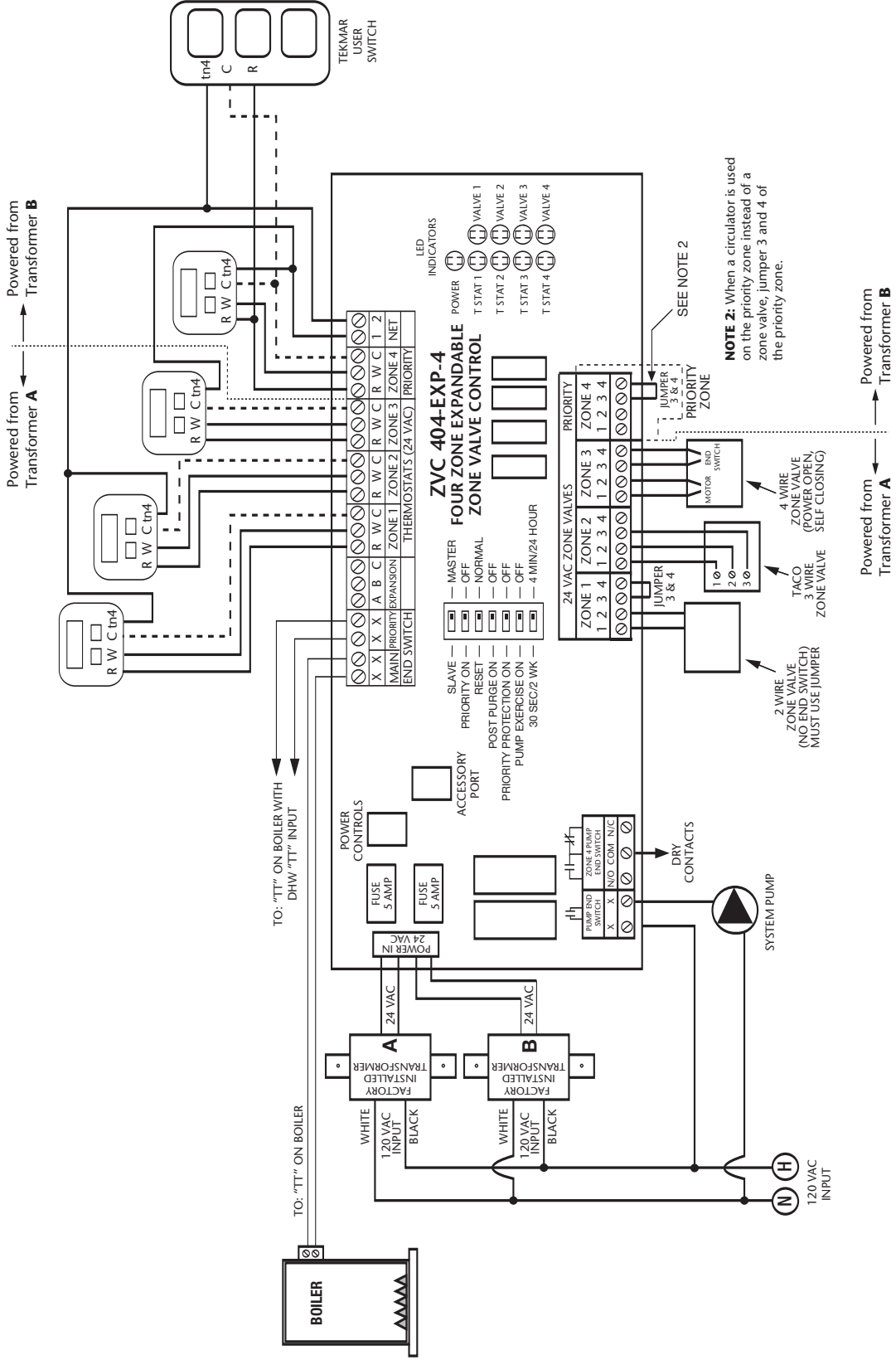
# ZVC404-EXP Zone Valve Control Connected to a MOD-CON Boiler



# TEKMAR Communication Thermostat (TN4) Connected to SR504-EXP Switching Relay

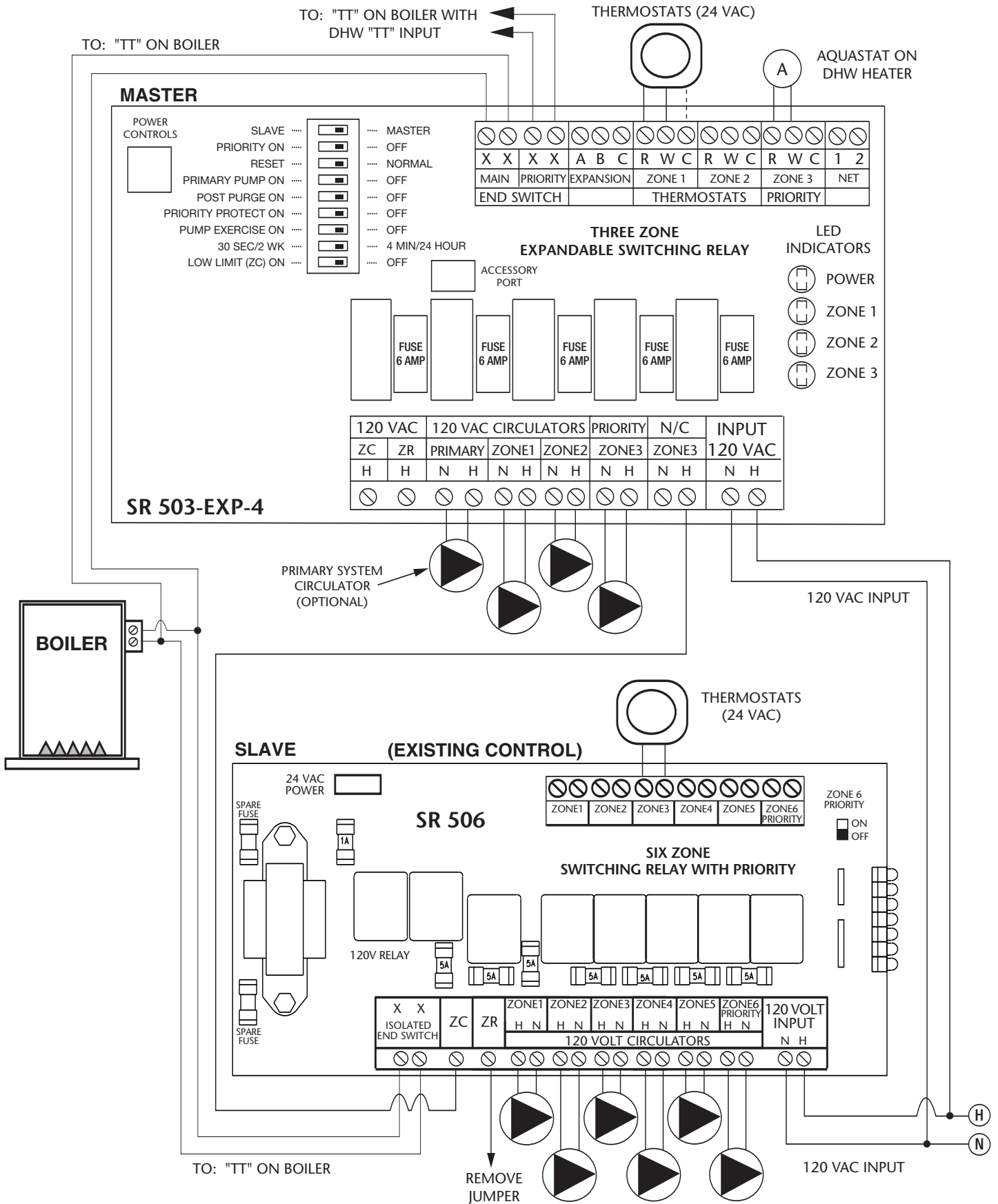


TEKMAR Communication Thermostat (TN4) Connected to ZVC404-EXP Zone Valve Control

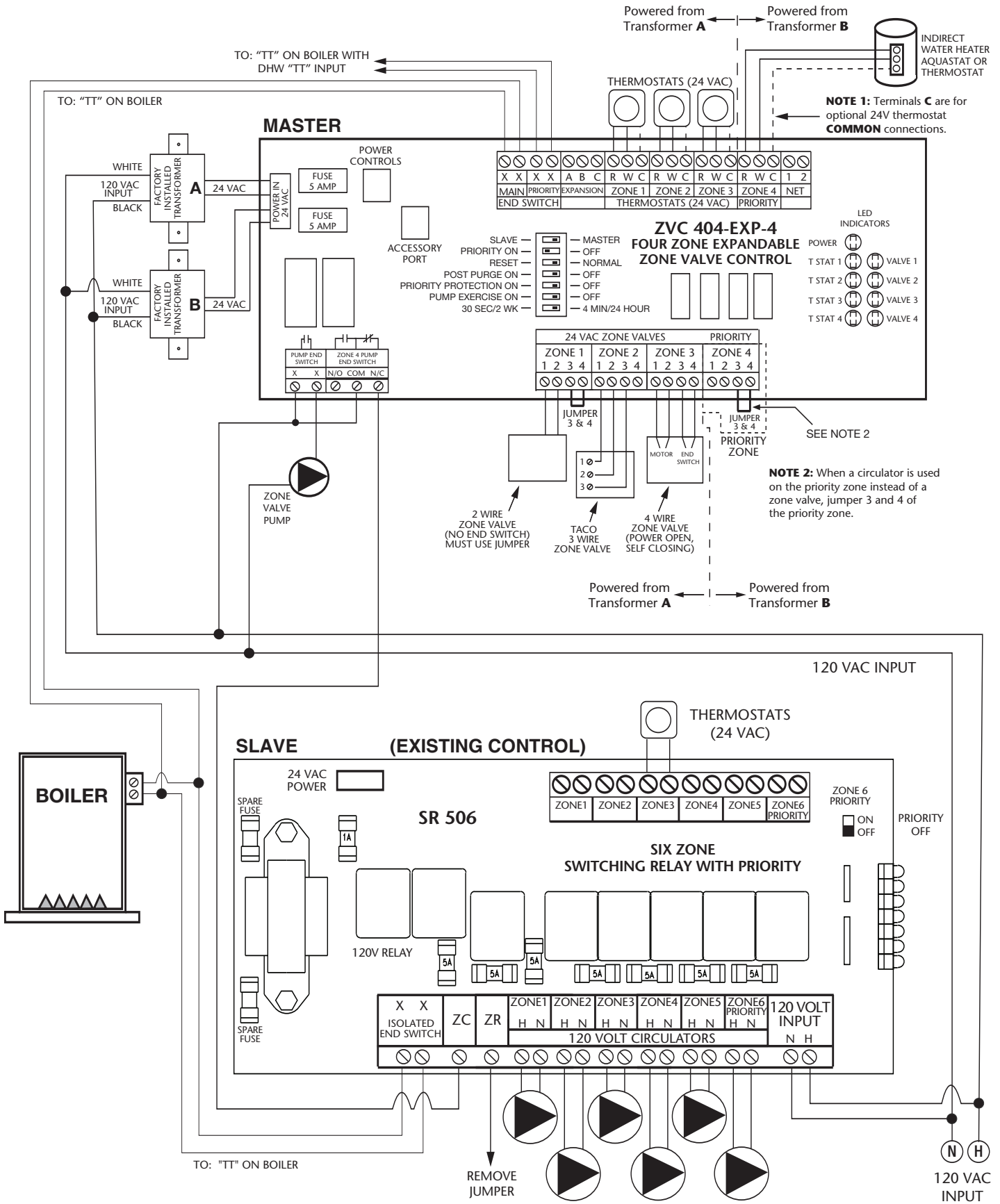




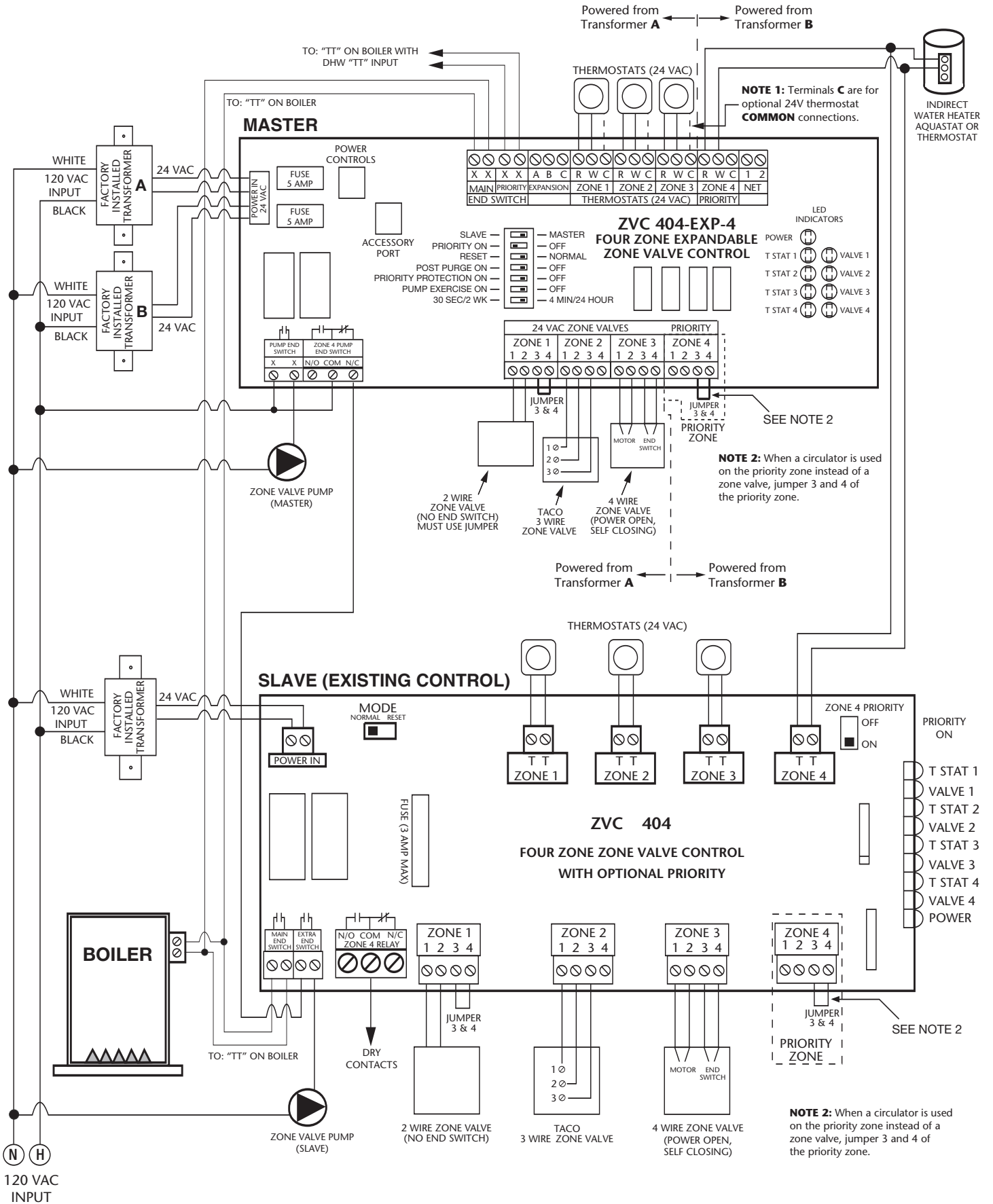
# SR503-EXP Switching Relay Controlling a Standard (Non-Expandable) Switching Relay



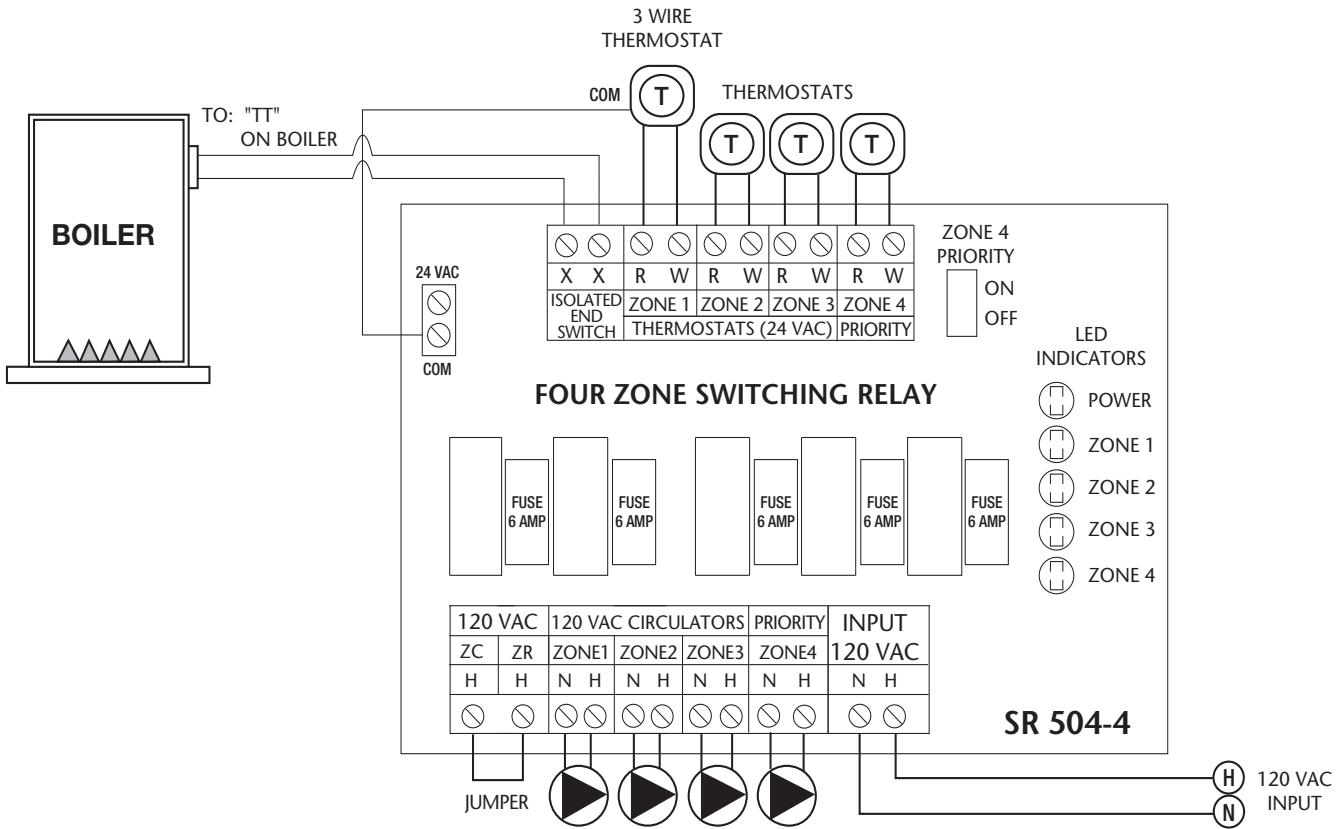
# ZVC404-EXP Zone Valve Control Controlling a Standard (Non-Expandable) Switching Relay



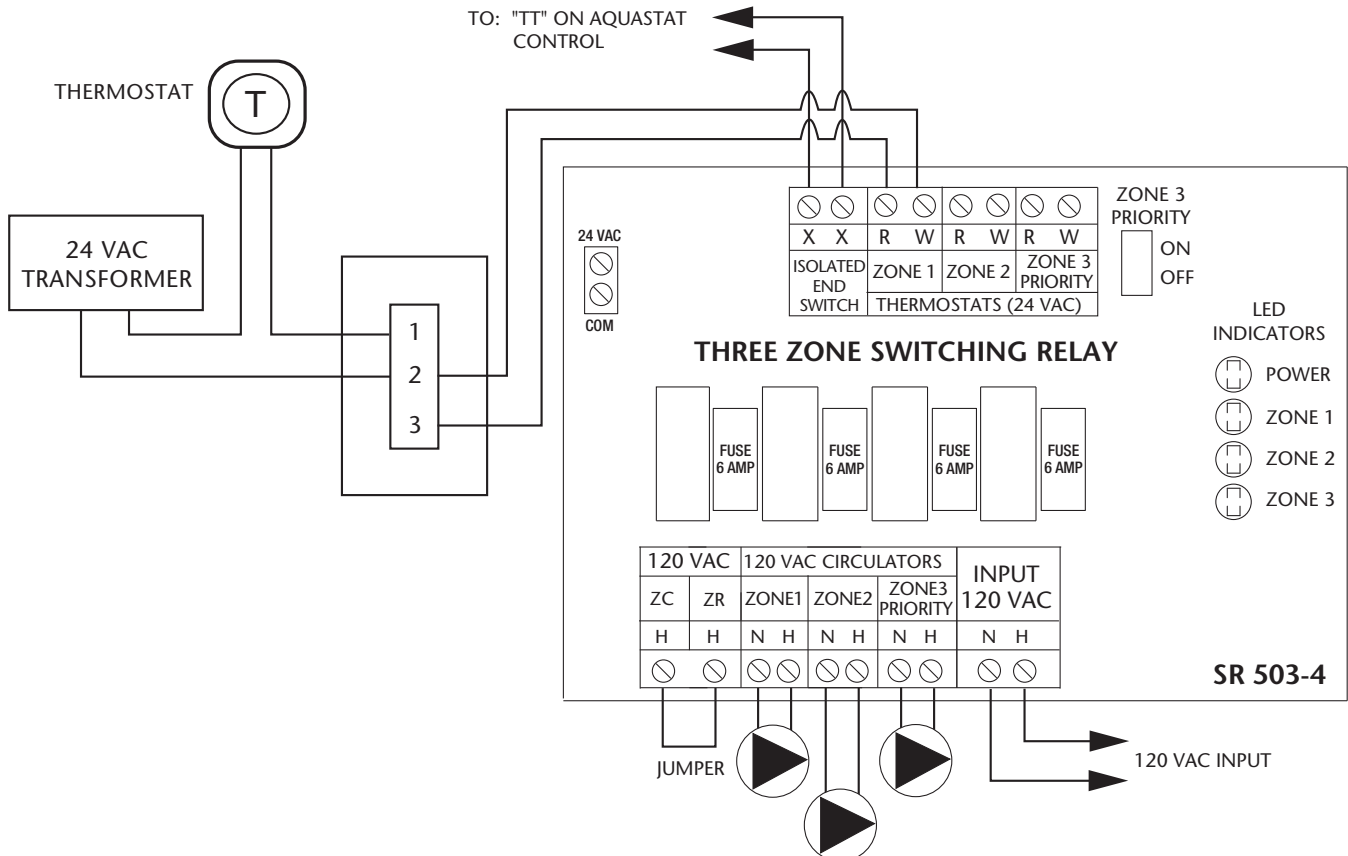
# ZVC404-EXP Zone Valve Control Controlling a Standard (Non-Expandable) Zone Valve Control



## 3 Wire Thermostat Connected to TACO Non-Expandable Switching Relay



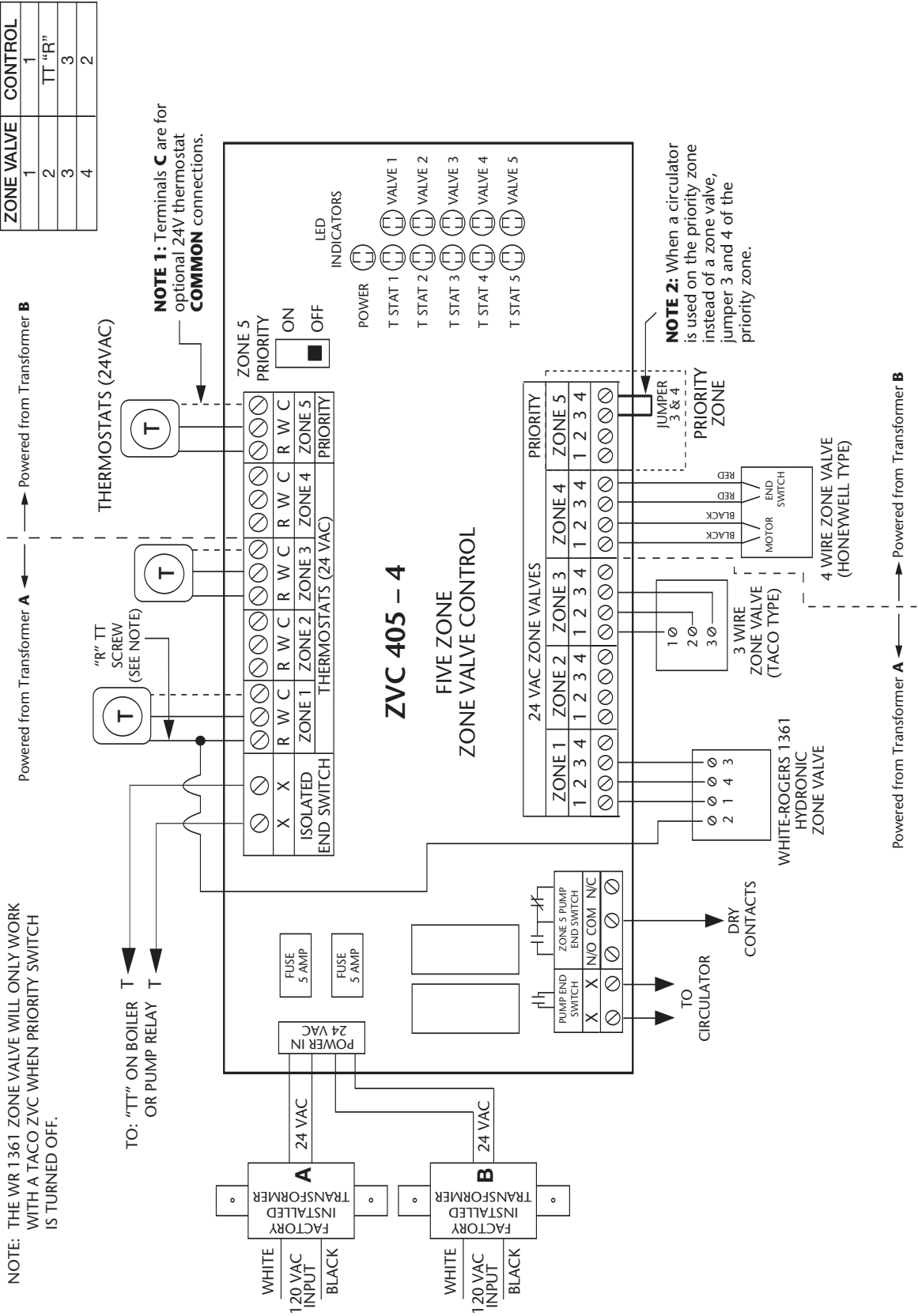
## 570 Zone Valve Connected to TACO Switching Relay



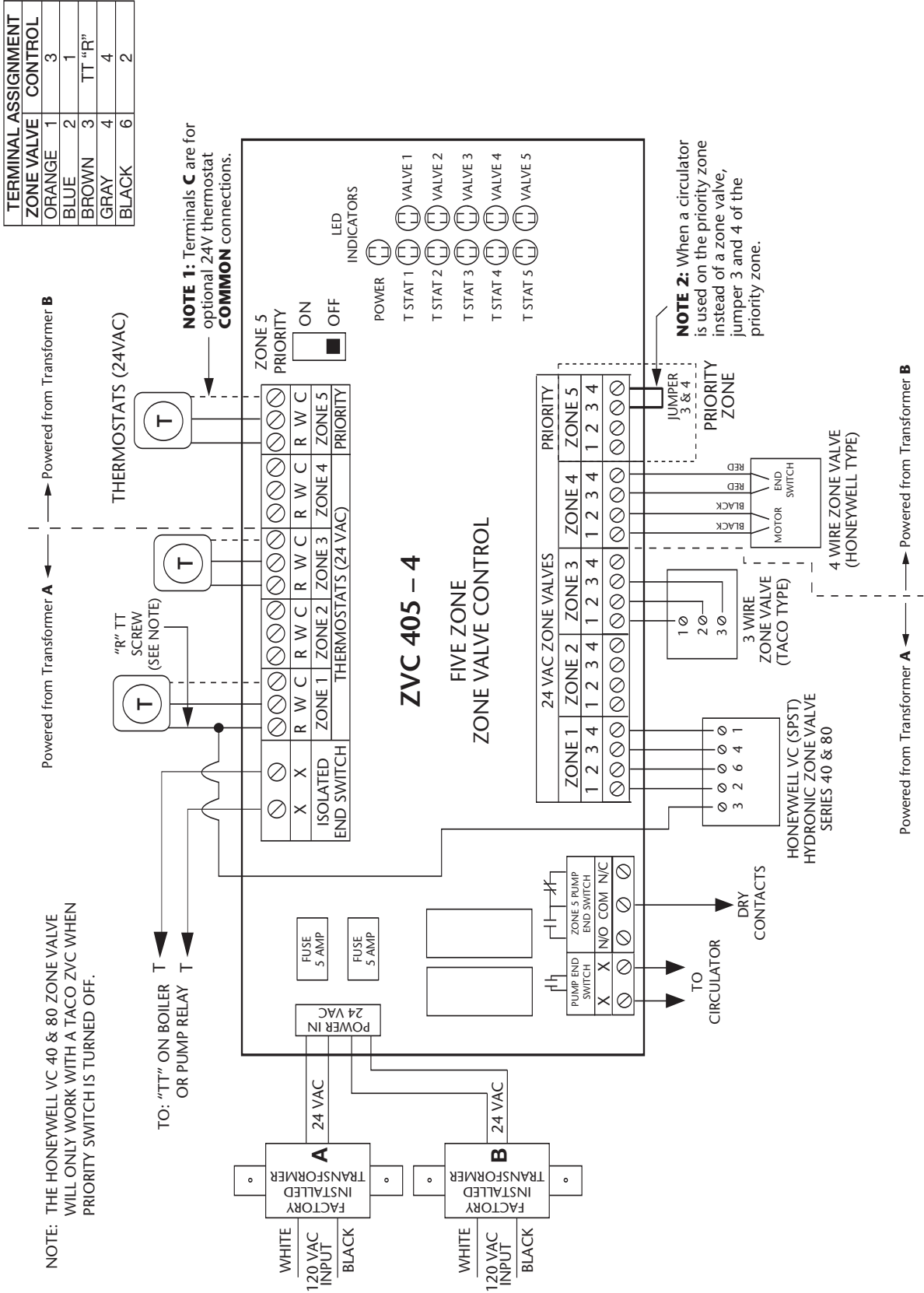
# White-Rogers 1361 Hydronic Zone Valve with TACO Zone Valve Control

TERMINAL ASSIGNMENT	ZONE VALVE	CONTROL
	1	1
	2	TT "R"
	3	3
	4	2

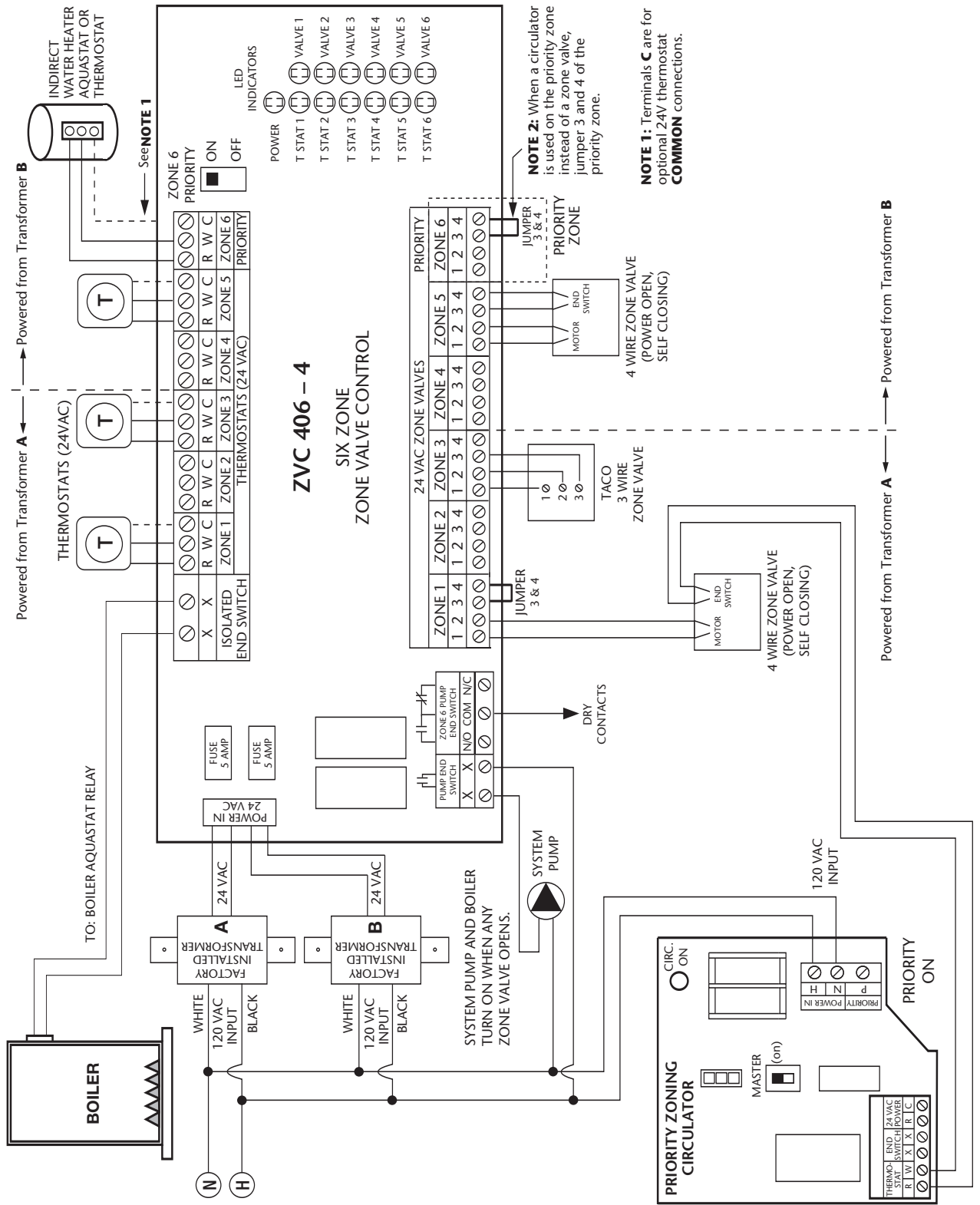
NOTE: THE WR 1361 ZONE VALVE WILL ONLY WORK WITH A TACO ZVC WHEN PRIORITY SWITCH IS TURNED OFF.



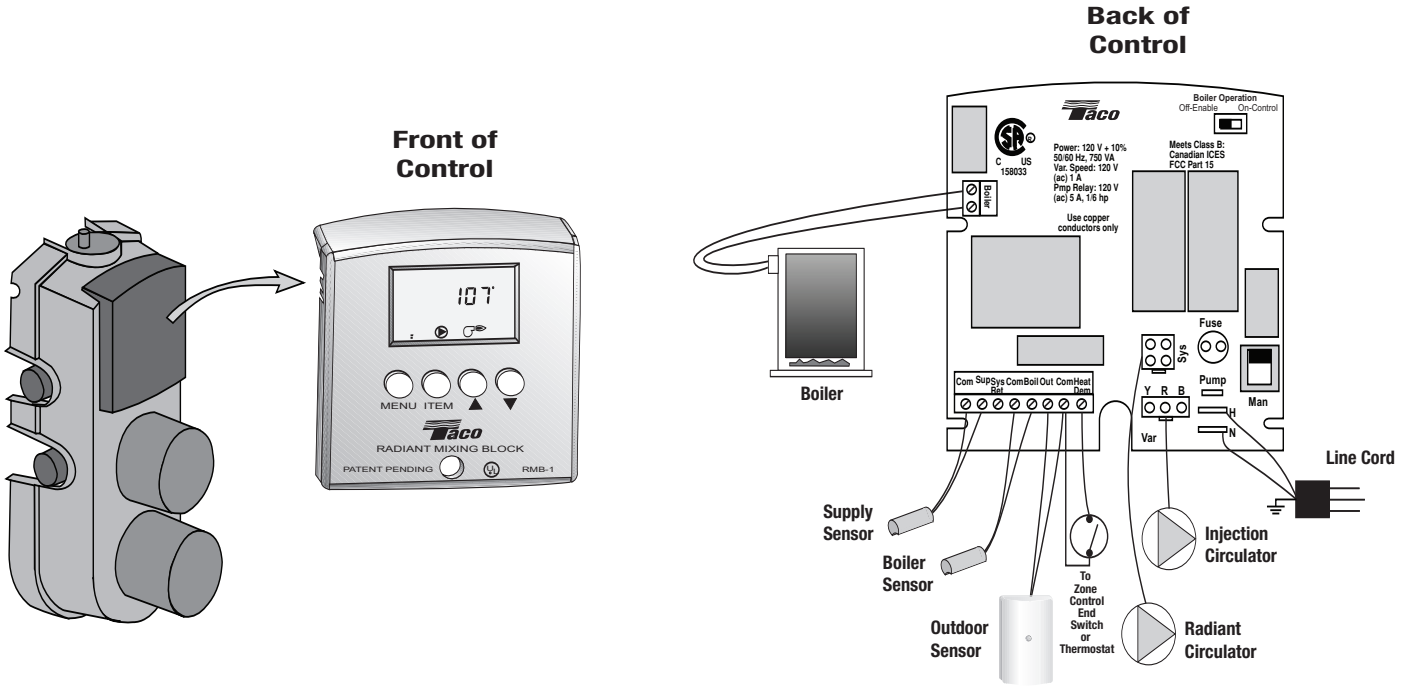
# Honeywell VC 40 & 80 (spdt) Hydronic Zone Valve with TACO Zone Valve Control



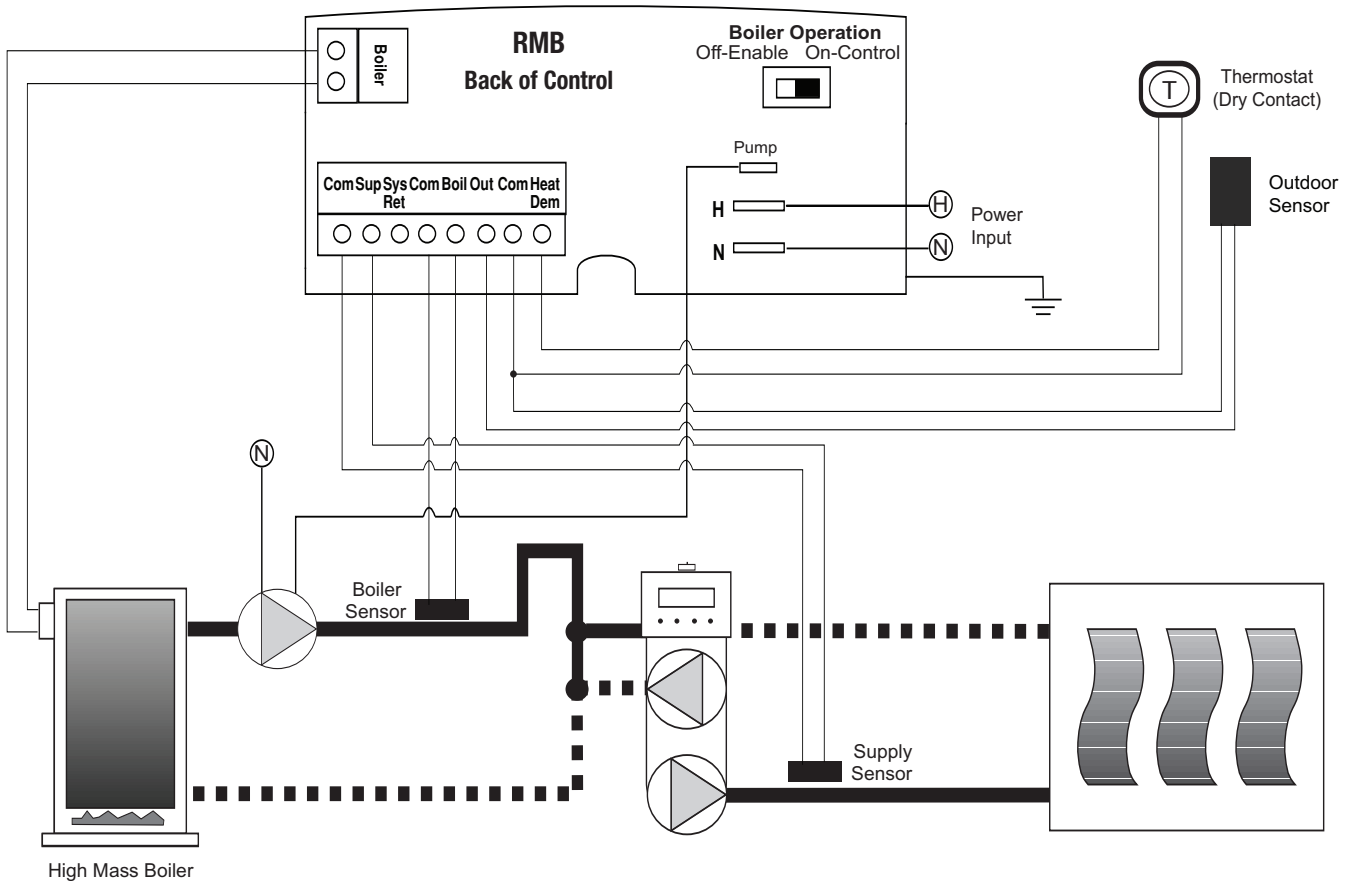
# Zone Valve Control with 1 Low Temperature Zone Using Priority Zoning Circulator



# Radiant Mixing Block (RMB)



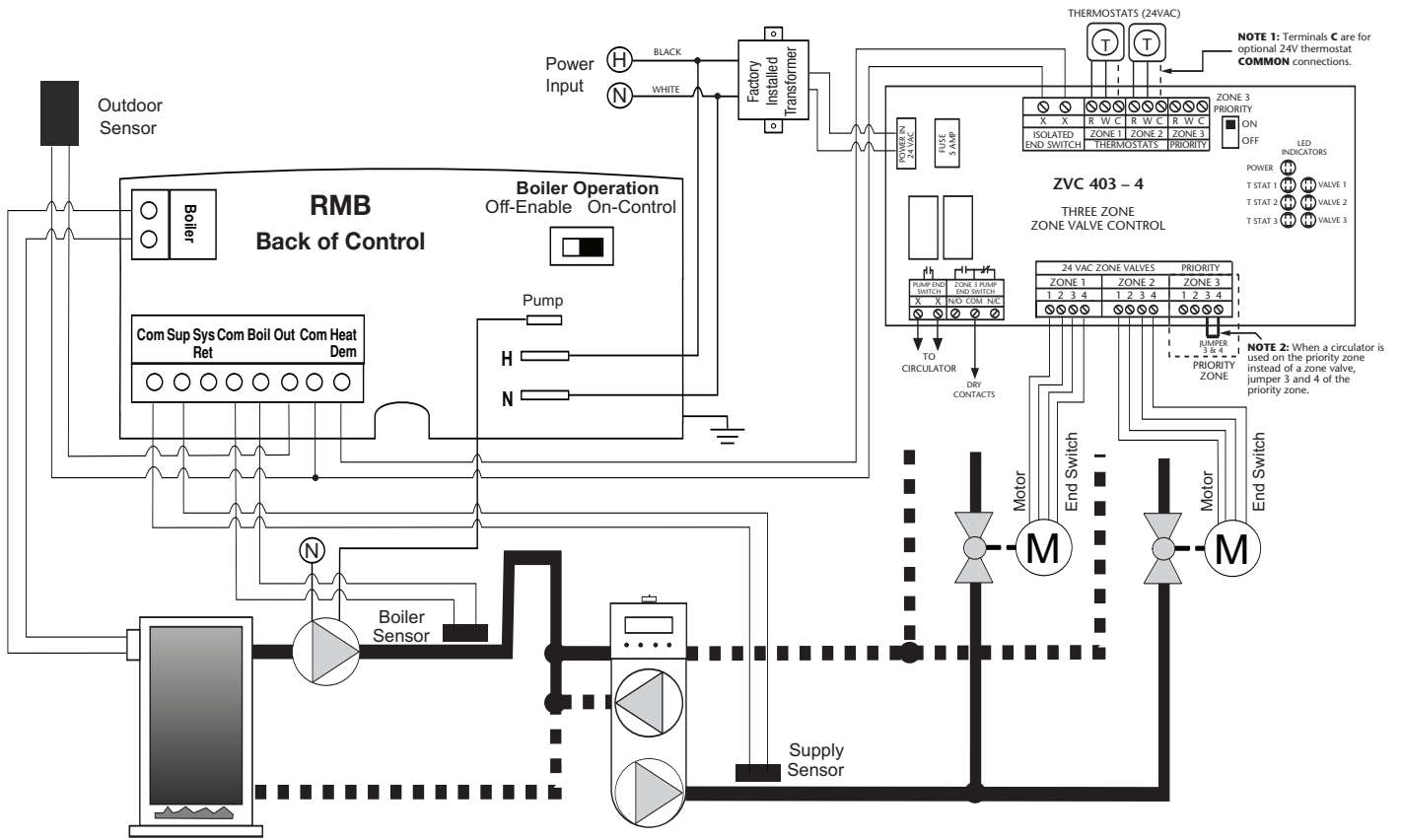
# Radiant Mixing Block, Single Zone



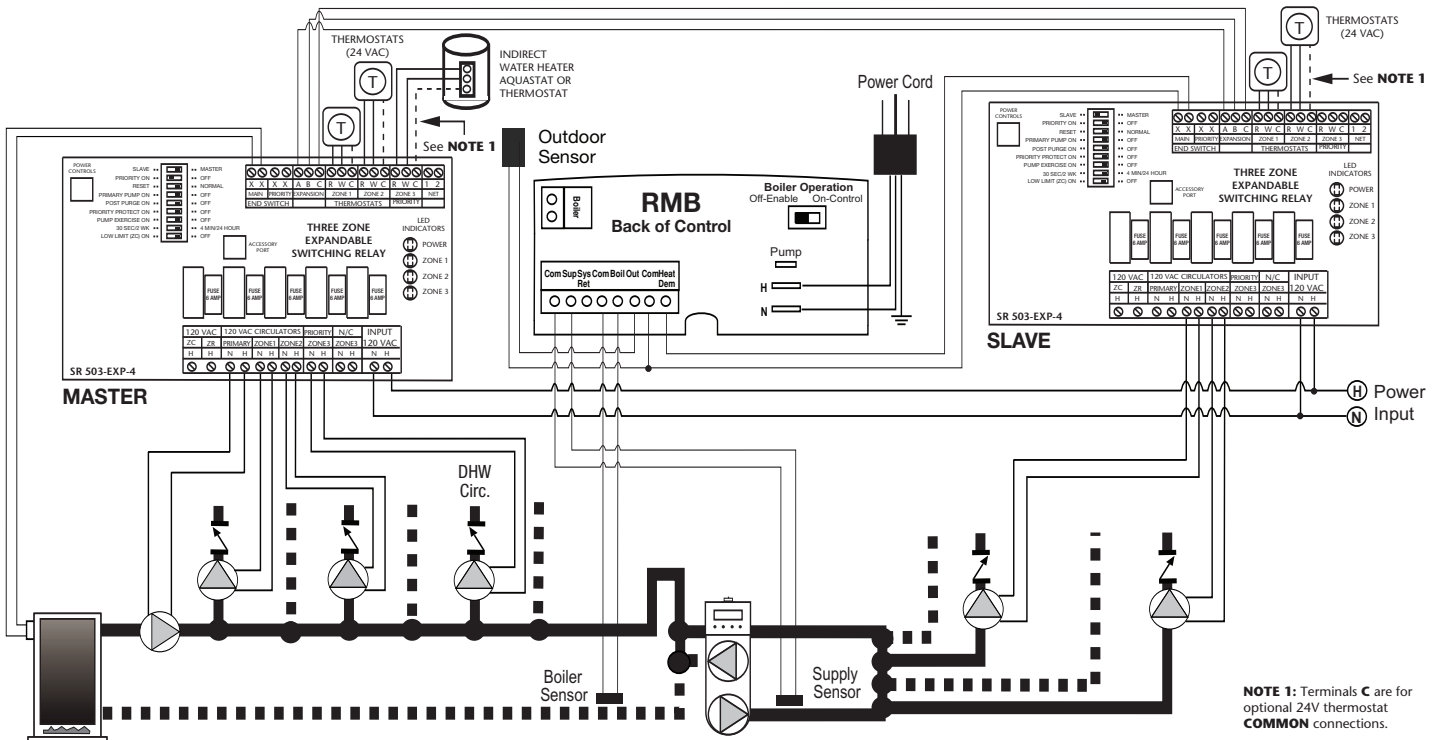
FOR ADDITIONAL WIRING DIAGRAMS, PLEASE SEE [www.taco-hvac.com/wiringwizard](http://www.taco-hvac.com/wiringwizard)



# Radiant Mixing Block Connected to Zone Valve Control with System Pump Wired off the RMB

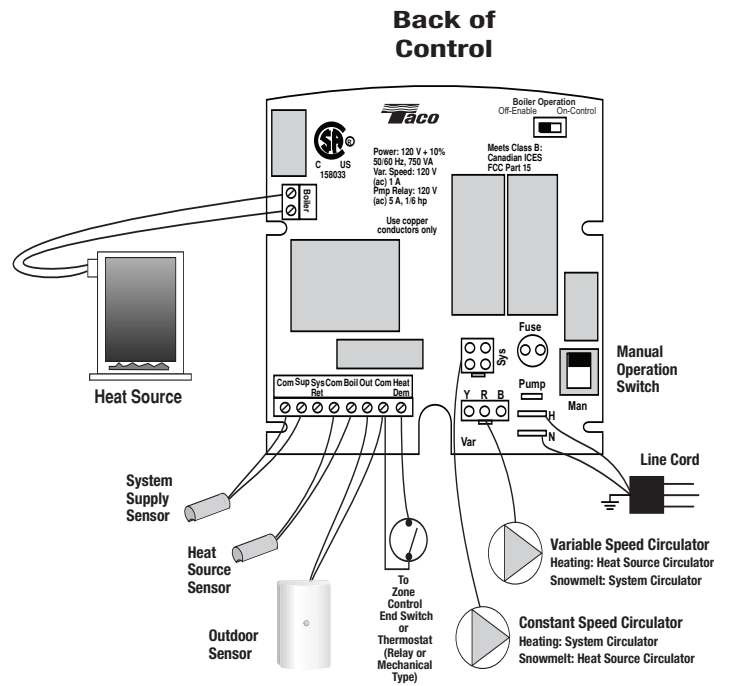
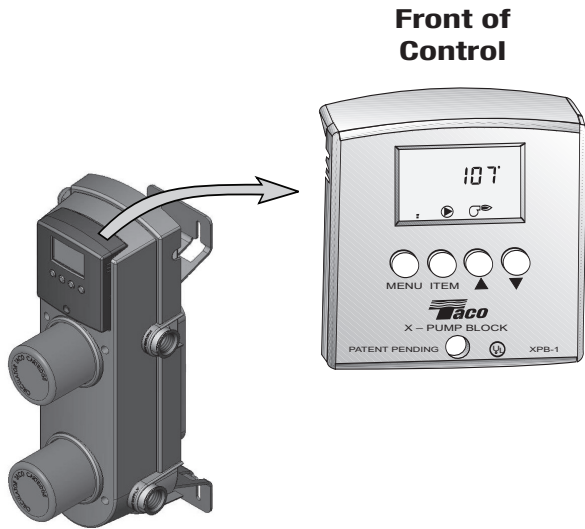


# Radiant Mixing Block Connected to 2 EXP Switching Relays with DHW Pump

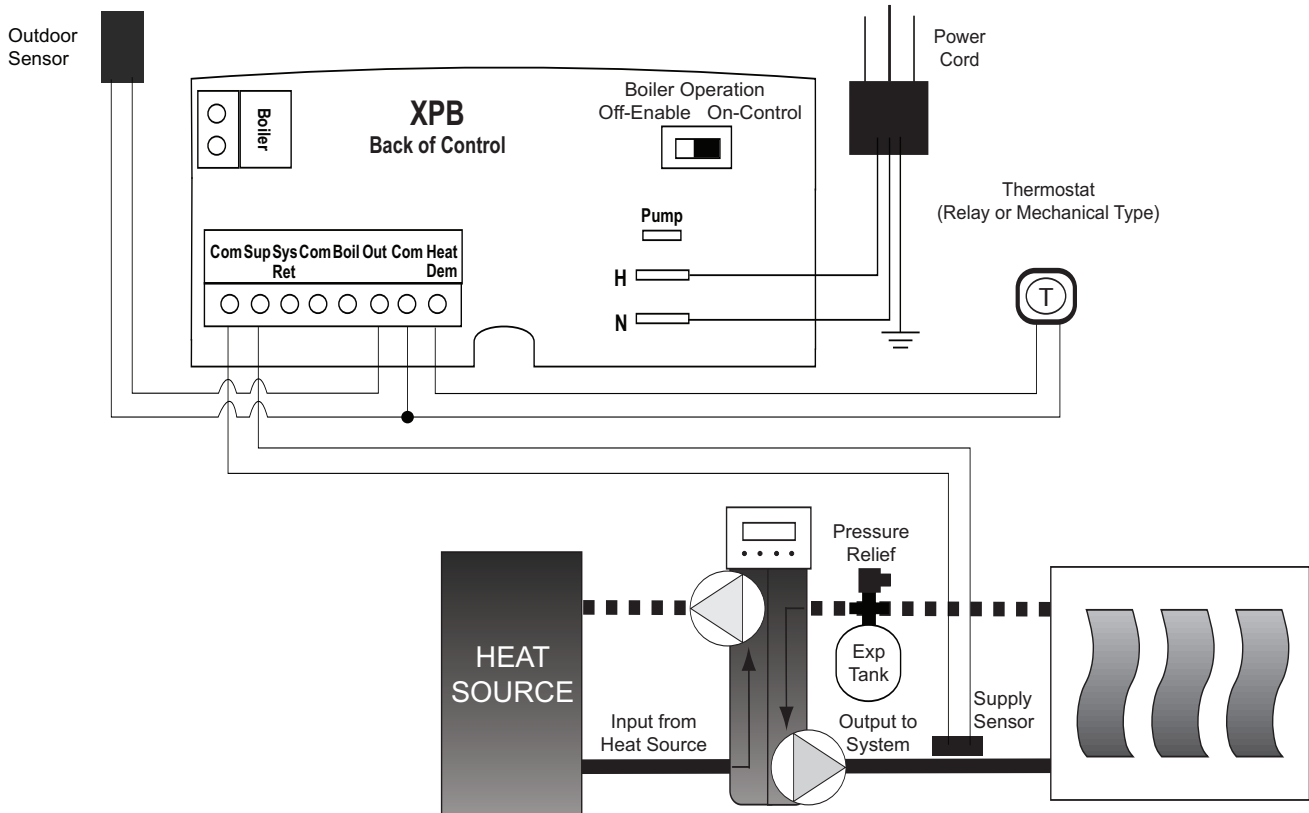


FOR ADDITIONAL WIRING DIAGRAMS, PLEASE SEE [www.taco-hvac.com/wiringwizard](http://www.taco-hvac.com/wiringwizard)

# X - Pump Block (XPB)

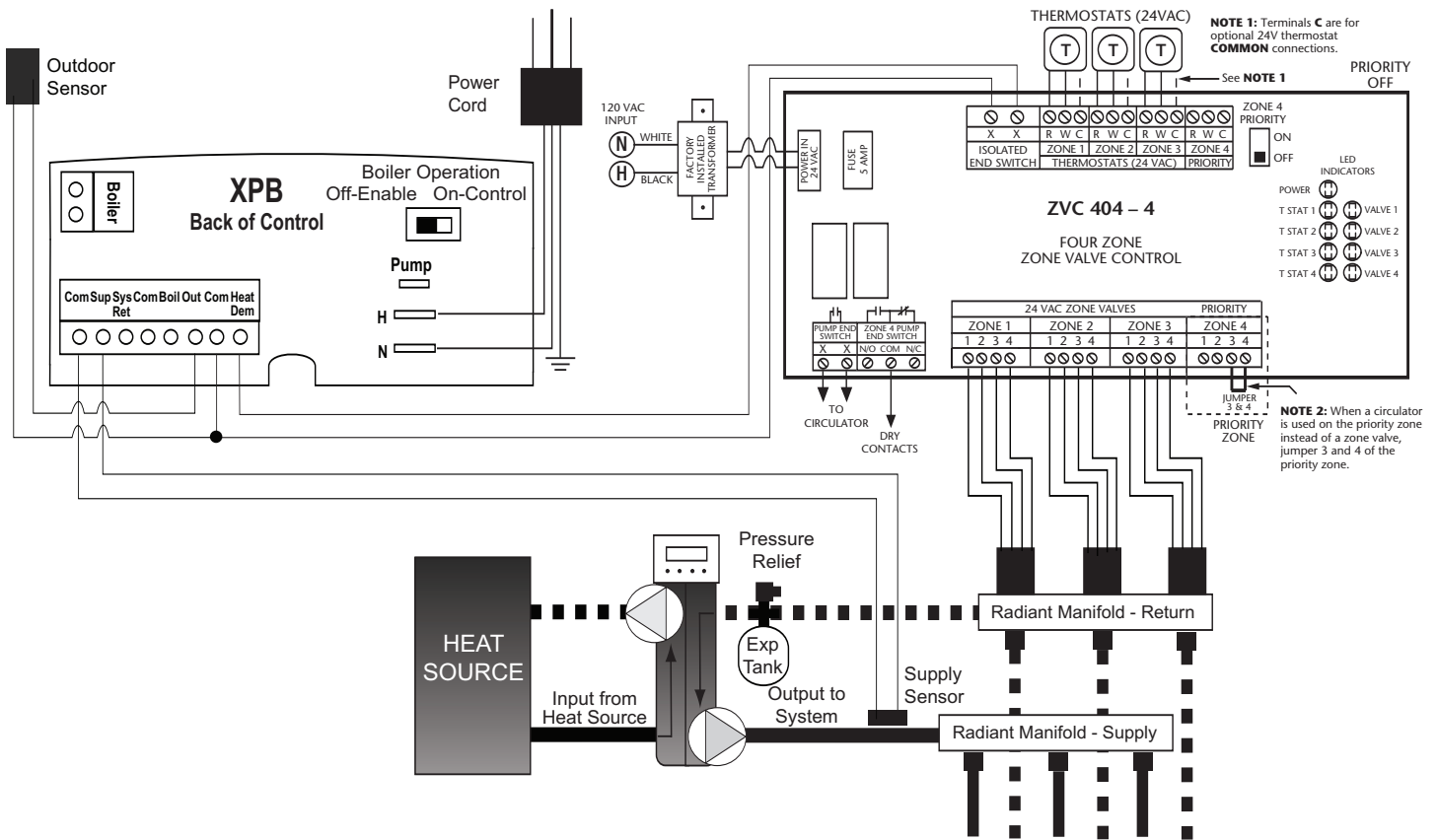


# X - Pump Block, Single Zone

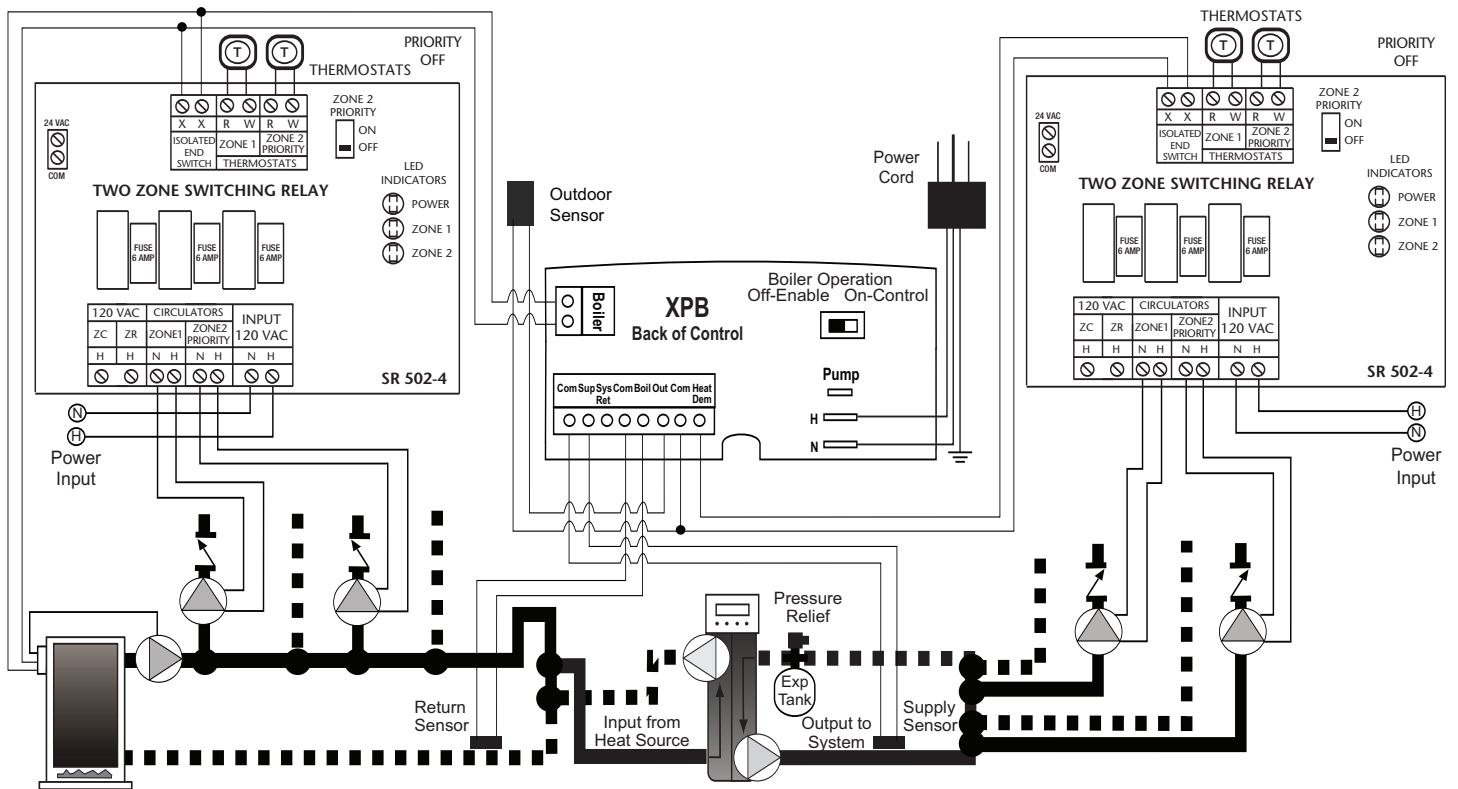


FOR ADDITIONAL WIRING DIAGRAMS, PLEASE SEE [www.taco-hvac.com/wiringwizard](http://www.taco-hvac.com/wiringwizard)

## X - Pump Block Connected to Zone Valve Control

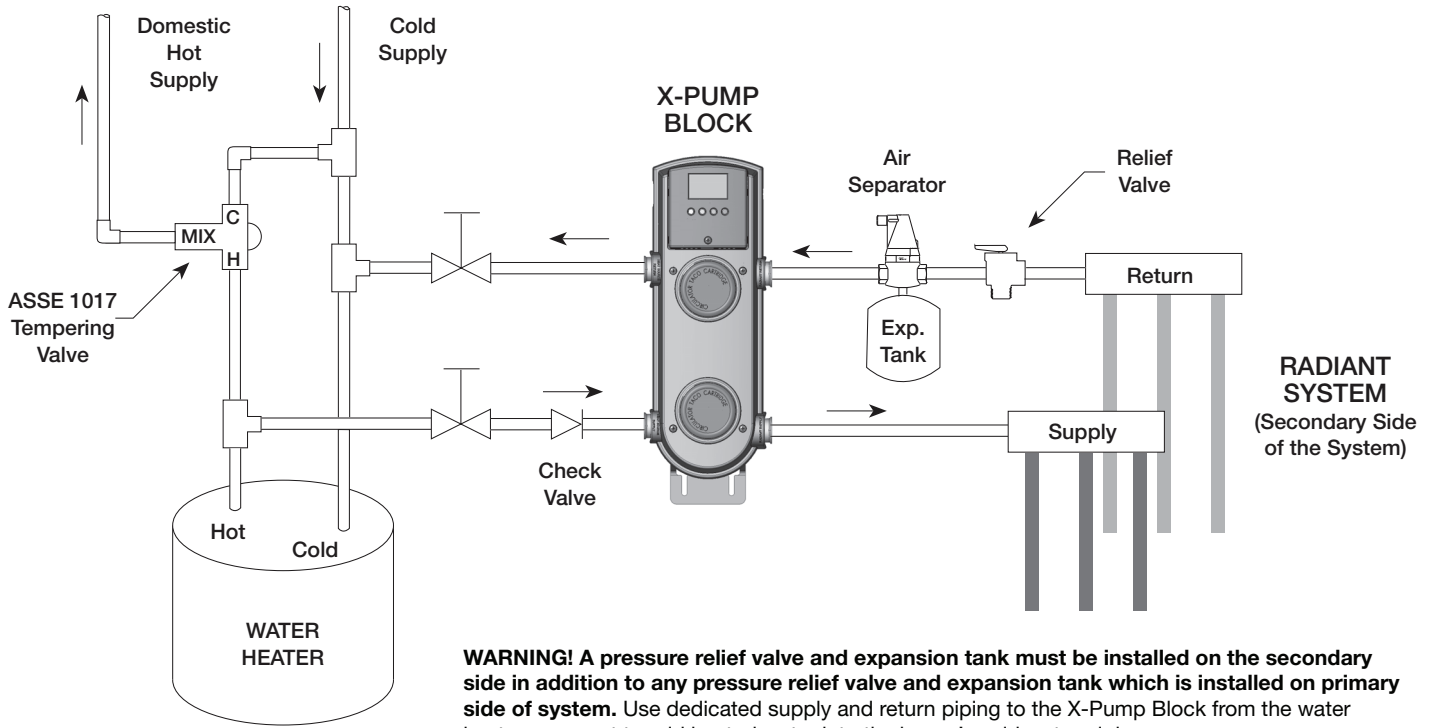


## X - Pump Block Connected to 2 SR502/503 Switching Relays

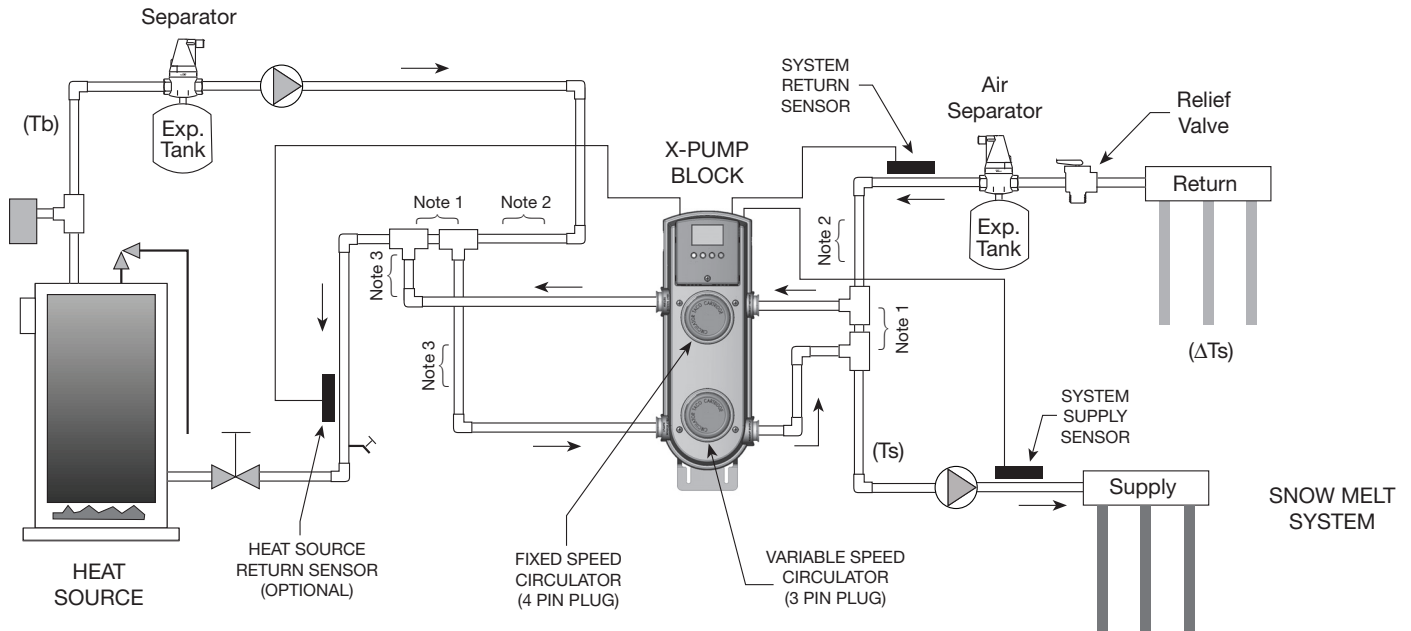


FOR ADDITIONAL WIRING DIAGRAMS, PLEASE SEE [www.taco-hvac.com/wiringwizard](http://www.taco-hvac.com/wiringwizard)

## Typical Radiant Floor to Water Heater Installation



## Typical Snow Melt Installation



T<sub>b</sub> = Boiler Supply Temperature

T<sub>s</sub> = System Supply Temperature

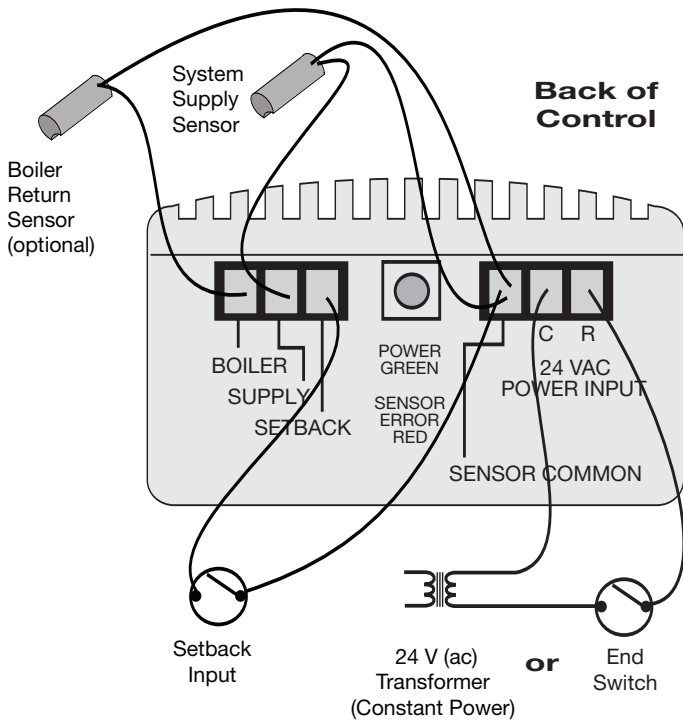
ΔT<sub>s</sub> = System Temperature Drop  
(typically 20°F for convectors  
and 10°F for radiant floor heating)

Note 1: There must be no more than 4 pipe diameters between the tees in the boiler and system loops in order to prevent ghost flow when the variable speed injection pump is off and either the boiler pump or system pump is on.

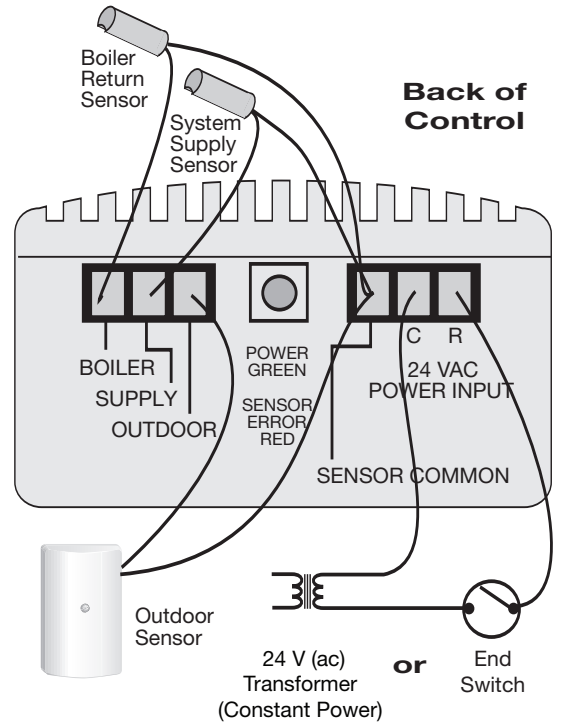
Note 2: There must be at least 6 pipe diameters of straight pipe on either side of the tees in order to prevent the momentum of water in the boiler and system loops from pushing flow through the injection loop.

Note 3: There should be a minimum 1 foot drop to create a thermal trap in order to prevent convective heat transfer through the injection loop.

## iSeries Mixing Valve

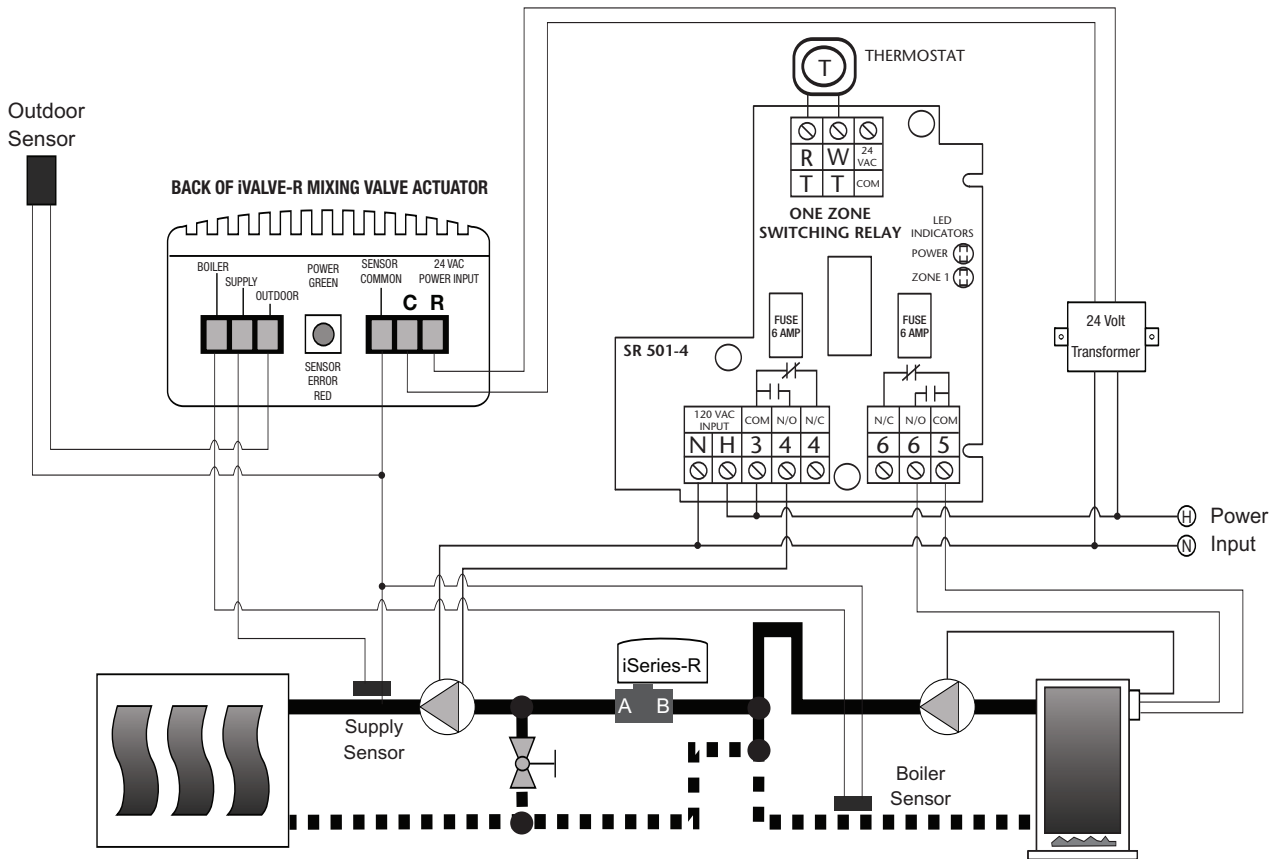


**iValve-S**



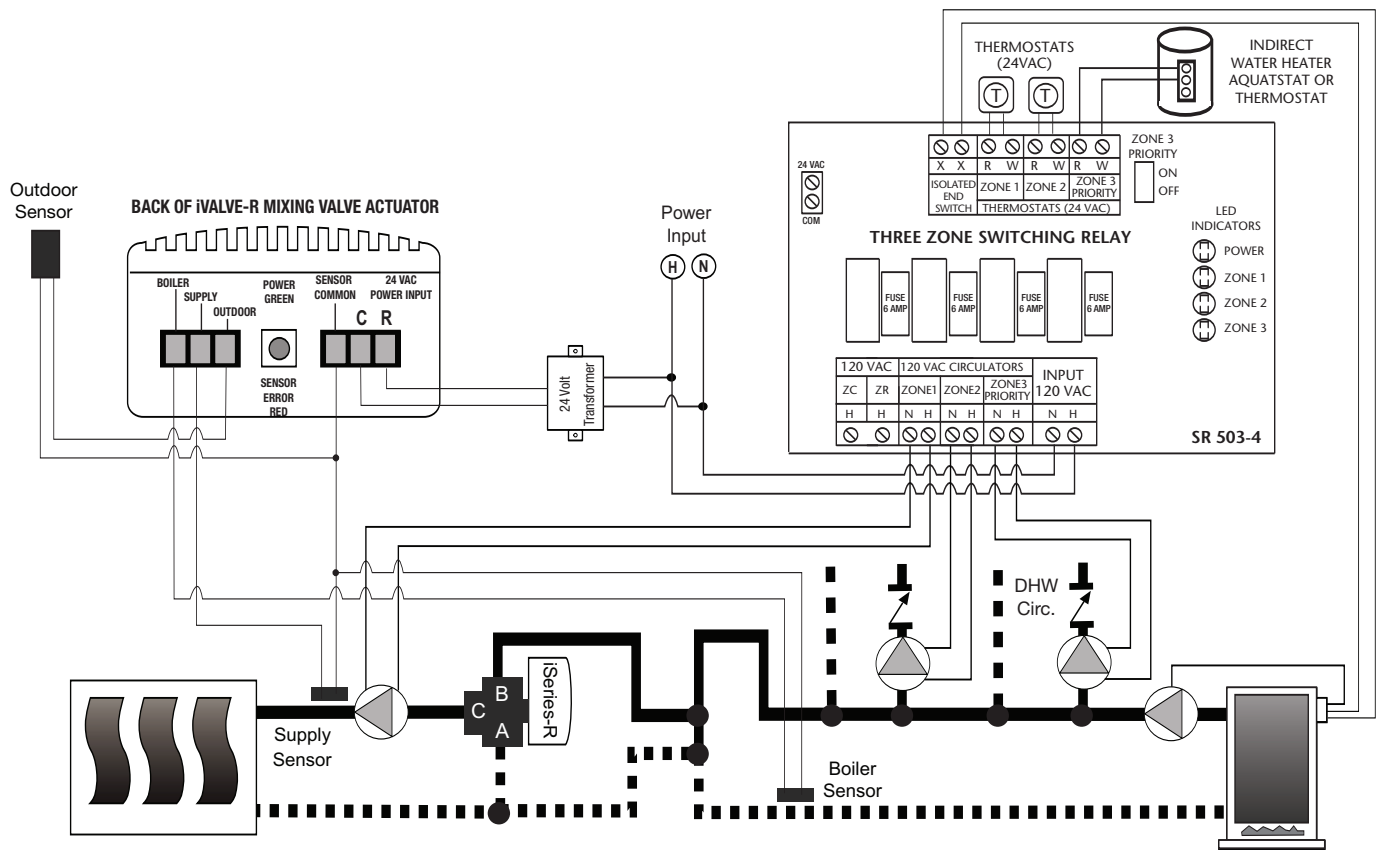
**iValve-R**

## iValve, 2-Way Injection, Single Zone

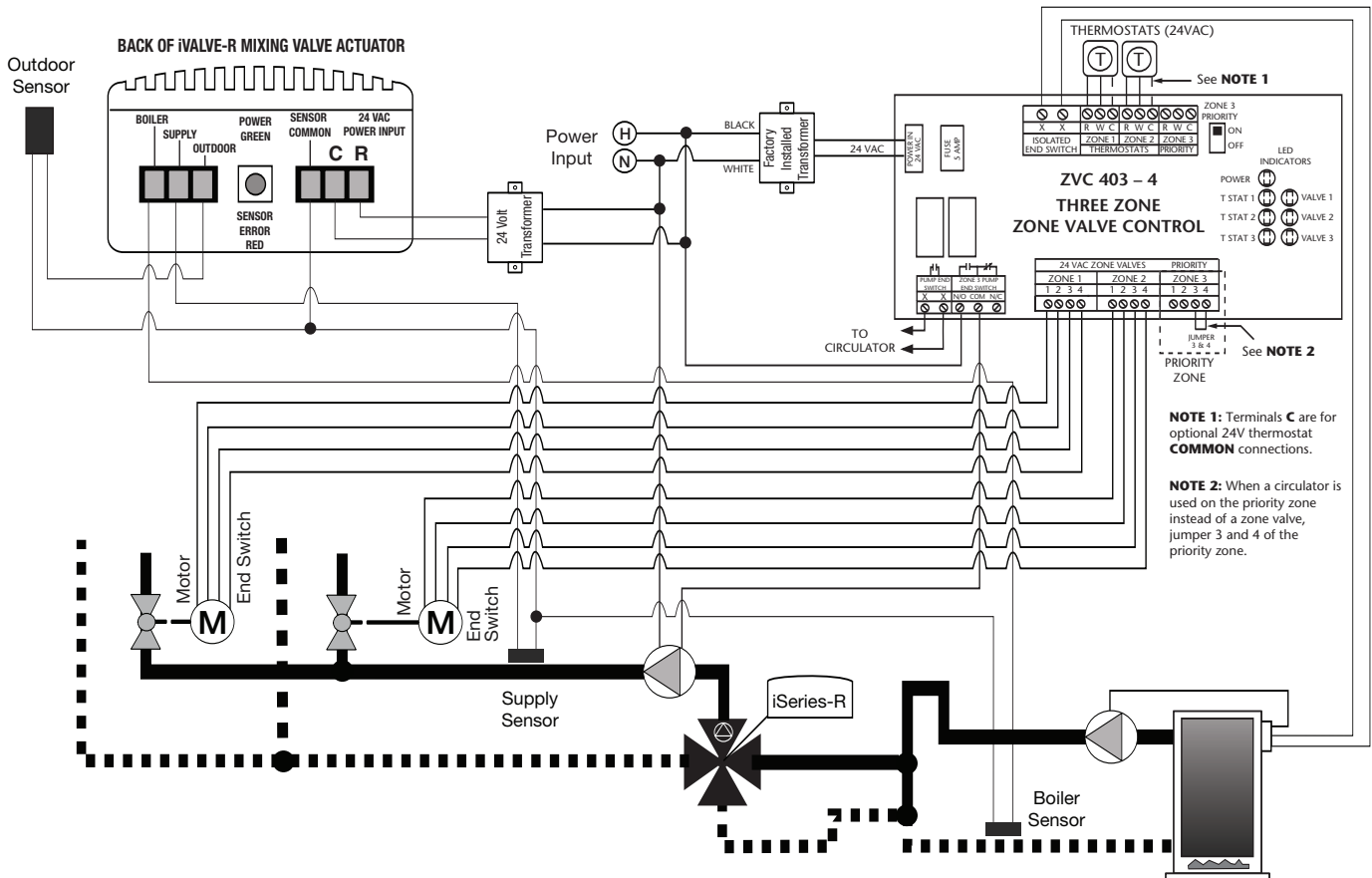


FOR ADDITIONAL WIRING DIAGRAMS, PLEASE SEE [www.taco-hvac.com/wiringwizard](http://www.taco-hvac.com/wiringwizard)

# iValve, 3-Way Mixing Working with SR502/503 Switching Relay with DHW Priority

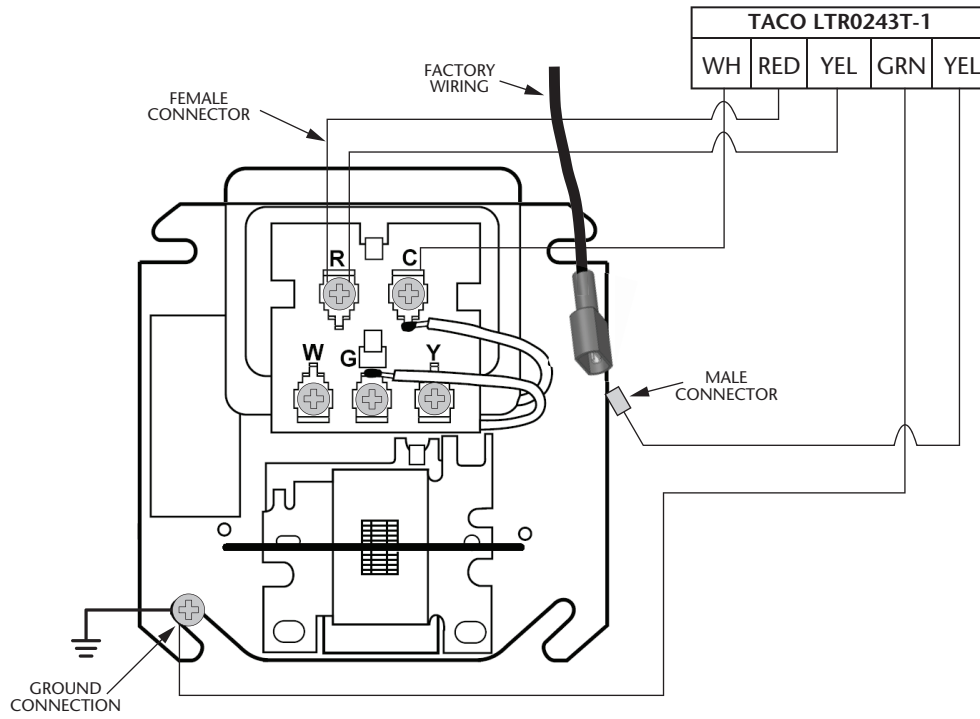


# iValve, 4-Way Mixing Working with Zone Valve Control

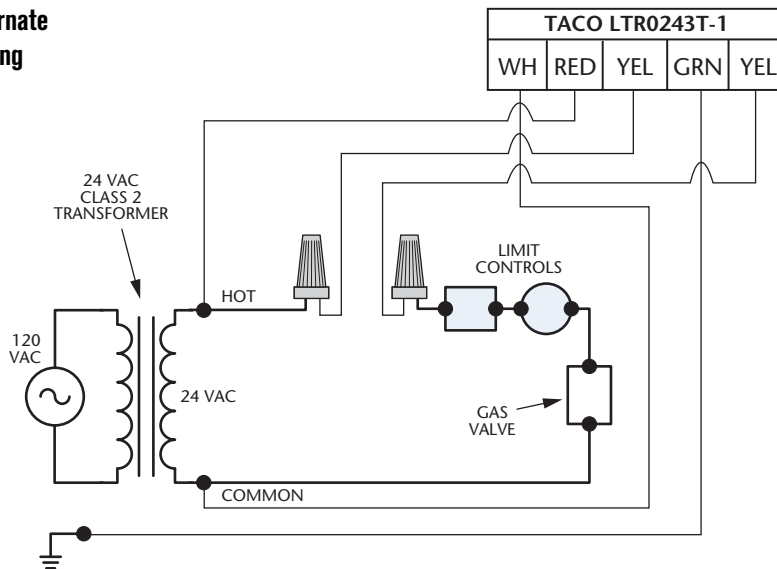


FOR ADDITIONAL WIRING DIAGRAMS, PLEASE SEE [www.taco-hvac.com/wiringwizard](http://www.taco-hvac.com/wiringwizard)

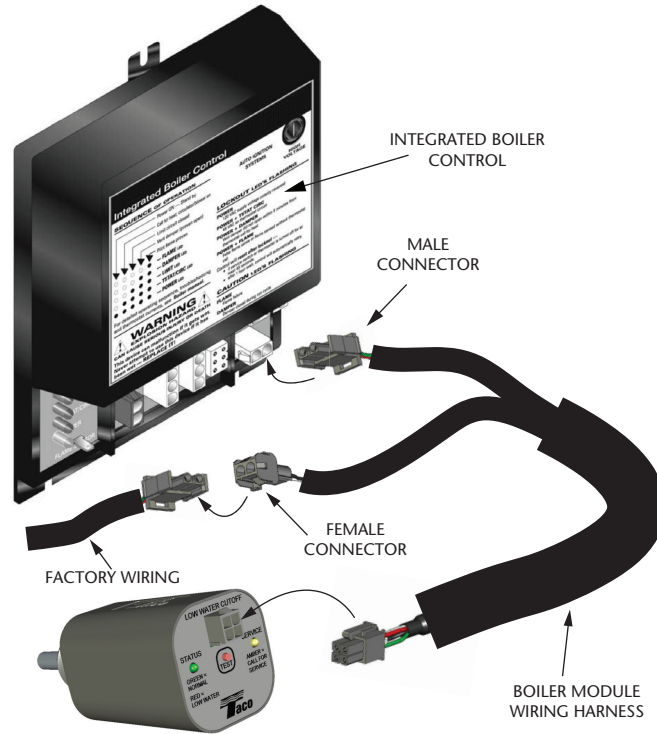
# Wiring for Boilers with Honeywell Control Center Model R8285 or Equivalent



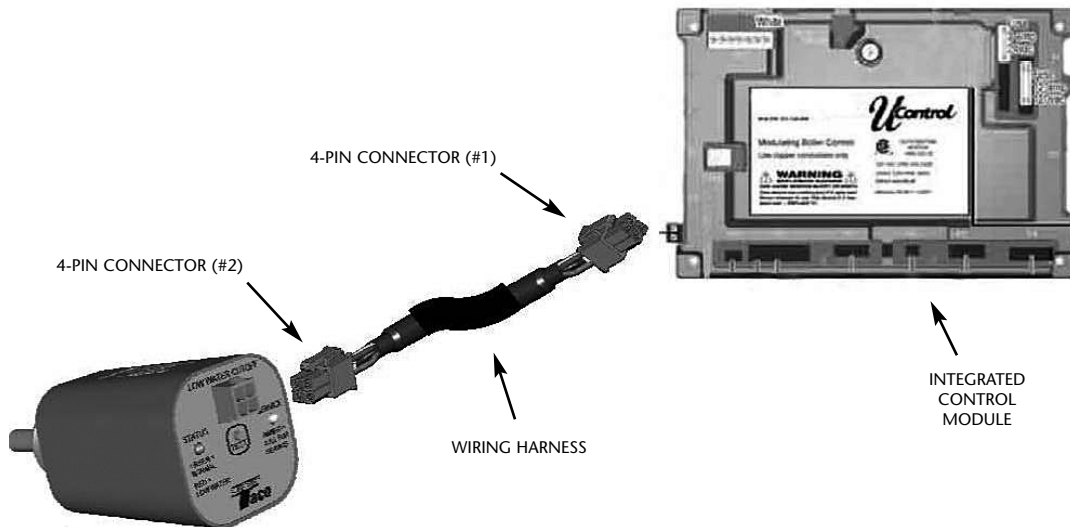
## Alternate Wiring



# Wiring Boilers with a United Technologies Integrated Control Module and a Taco LTR0243U-1



## Wiring Boilers with a United Technologies Ucontrol or other Integrated Control Modules which accept a 4-pin harness and a Taco LTR0243L-1

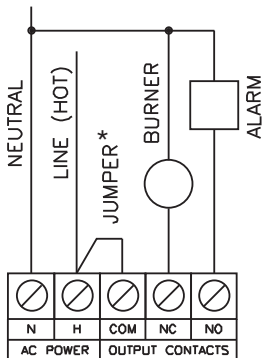


### Wiring Instructions

1. Plug the 4-pin connector on the wiring harness (#1 as shown) into the integrated control module.
2. Plug the 4-pin connector on the wiring harness (#2 as shown) into the LTR.



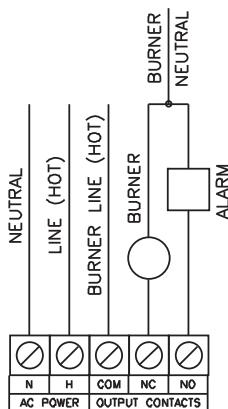
## Wiring Taco LN and LTA-2 Series Low Water Cutoffs Using Burner Circuit Power Source



\*Factory Installed

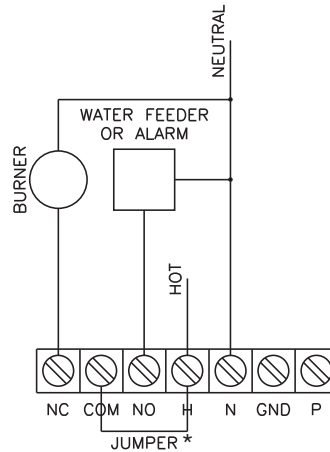
**NOTE:** For 24 VAC models, LNA024xx and LTA0243S-2, 24 VAC to be supplied by an **EXTERNAL** Class 2 power source to terminals H and N. For 120 VAC models, LNA120xx and LTA1203S-2, 120 VAC is supplied by an external circuit to terminals H and N.

## Wiring Taco LN and LTA-2 Series Low Water Cutoffs Using Power Source Other Than Burner Circuit



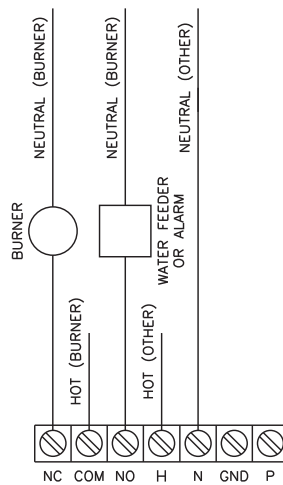
**NOTE:** For 24 VAC models, LNA024xx and LTA0243S-2, 24 VAC to be supplied by an **EXTERNAL** Class 2 power source to terminals H and N. For 120 VAC models, LNA120xx and LTA1203S-2, 120 VAC is supplied by an external circuit to terminals H and N.

## Wiring Taco LT Series (1st generation, -1) Low Water Cutoffs Using Burner Circuit Power Source



**NOTE:** For 24 VAC models, LTx024xx-1, 24 VAC to be supplied by an **EXTERNAL** Class 2 power source to terminals H and N. For 120 VAC models, LTx120xx-1, 120 VAC is supplied by an external circuit to terminals H and N.

## Wiring Taco LT Series (1st generation, -1) Low Water Cutoffs Using Power Source Other Than Burner Circuit



**NOTE:** For 24 VAC models, LTx024xx-1, 24 VAC to be supplied by an **EXTERNAL** Class 2 power source to terminals H and N. For 120 VAC models, LTx120xx-1, 120 VAC is supplied by an external circuit to terminals H and N.



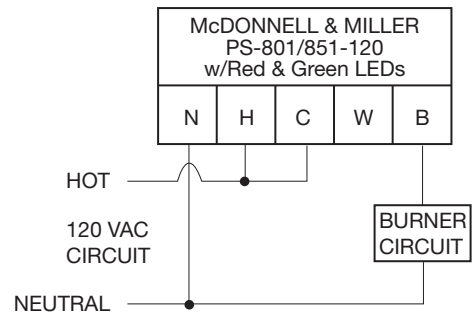
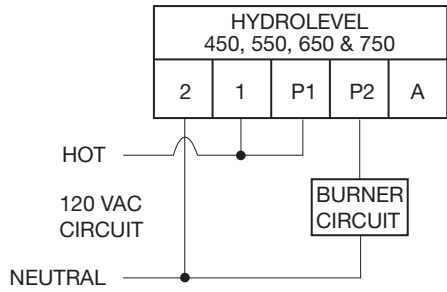
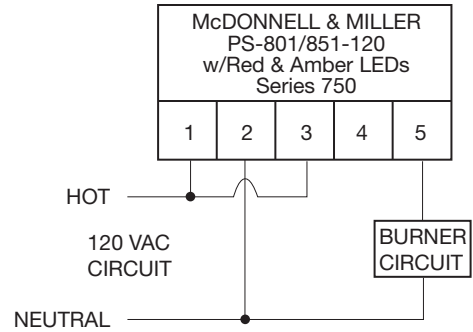
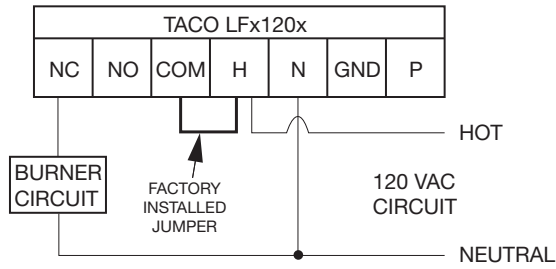
## Taco Low Water Cutoff Replacement Guide

Taco	McDonnell & Miller	Hydrolevel	Honeywell
LFA1203S-1 <i>LTA1203N-1</i> <i>LTA1203S-1</i>	PS-801-120 <b>PS-800-120</b> <b>PS-850-120</b> <b>900</b> <b>900C</b>	450 CG450 650 650SV <b>OEM170C</b> <b>OEM170TD</b>	RW700A1031 RW700A1056 RW700A1080
LFM1203S-1 <i>LTM1203N-1</i> <i>LTM1203S-1</i>	PS-801-M-120 PS-851-M-120 PS-851-SP-M-120 <b>PS-850-M-120</b> <b>900M</b> <b>901M</b> <b>902M</b>	550 550SV 750 <b>OEM170MC</b> <b>OEM170M</b>	RW700B1054 RW700B1039 RW700B1021
LFA0243S-1 <i>LTA0243N-1</i> <i>LTA0243S-1</i>	PS-802-24 <b>PS-800-24</b> <b>PS-850-24</b>	400 CG400 600 600SV <b>OEM24C</b> <b>OEM24TD</b>	RW700A1098
LFM0243S-1 <i>LTM0243N-1</i> <i>LTM0243S-1</i>	PS-802-M-24 PS-852-M-24 PS-852-SP-M-24 <b>PS-850-M-24</b>	500 500SV 700 <b>OEM24MC</b>	
LFA1203R-1 <i>LTA1203R-1</i>	750-T-120 <b>750-120</b>	650R	
LFM1203R-1 <i>LTM1203R-1</i>	750-MT-120 <b>750-M-120</b>	550R	
LFA1202R-1 <i>LTA1202R-1</i>	PS-851-RX2-120	650R	
LFM1202R-1 <i>LTM1202R-1</i>	PS-851-M-RX2-120	550R	
LFA0242R-1 <i>LTA0242R-1</i>	PS-802-RX2-24	400R	
LTR0243T-1 LTA0243S-2 <i>LNA0243S-1</i>	RB-24E <b>RB-24</b>	24SV 1100	
LTA1203S-2 <i>LNA1203S-1</i>	RB-120 RB-122E PS-851-120 PS-851-SP-120 PS-852-24 PS-852-SP-24 750P-MT-120 750P-MT-U-120 <b>901</b> <b>RB-120II</b> <b>RB-122</b>	170SV 1150 <b>OEM170</b>	RW700A1007 RW700A1006
P3R-1	RS-1-LP RS-1-LP-S		
EWf120	WF2-U-120V <b>WF-2-120</b> <b>WF-4-120</b>	VRTX-120 <b>V-120-1&amp;2</b>	VW400A1004
EWf024	WF2-U-24V <b>WF-2-24</b> <b>WF-4-24</b>	VRTX-24 <b>V-24-1&amp;2</b>	VW800A1004

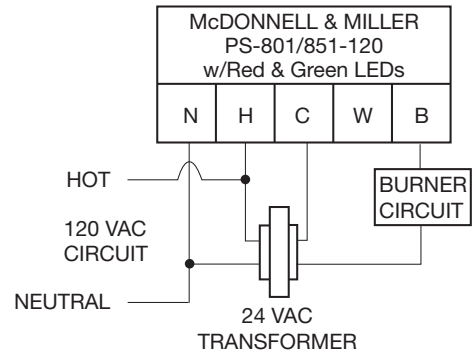
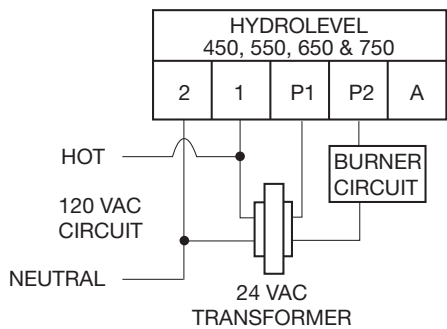
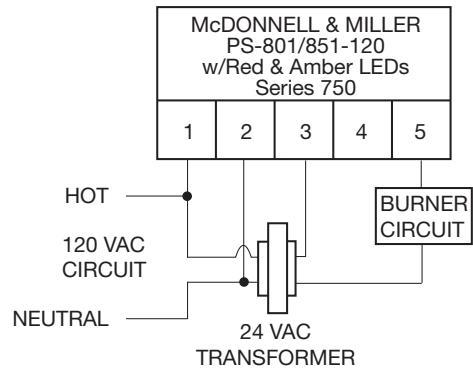
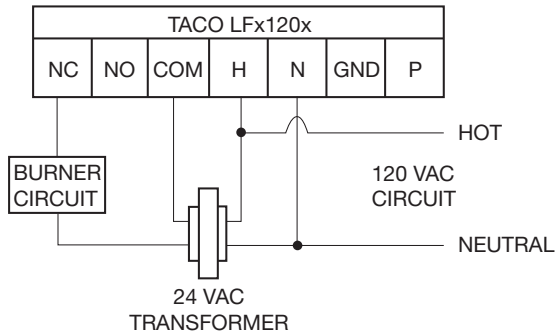
**Bold / Italics Indicates Discontinued Part Number**

# Taco LF Series 120 Volt LWCO Competitive Wiring Cross Reference

## 120 VAC Models with 120 VAC Burner Circuits

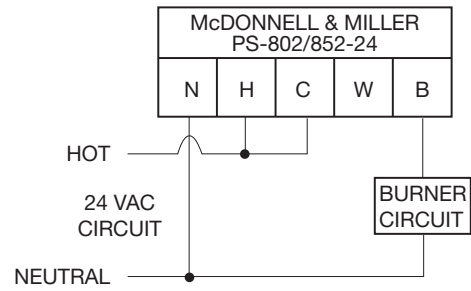
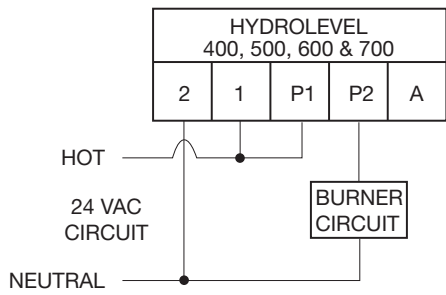
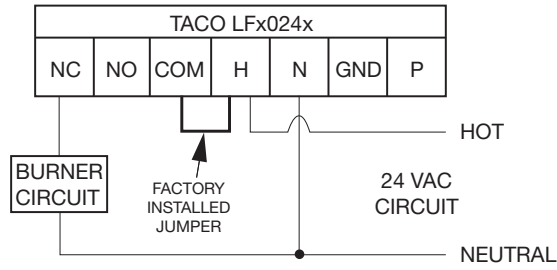


## 120 VAC Models with 24 VAC Burner Circuits

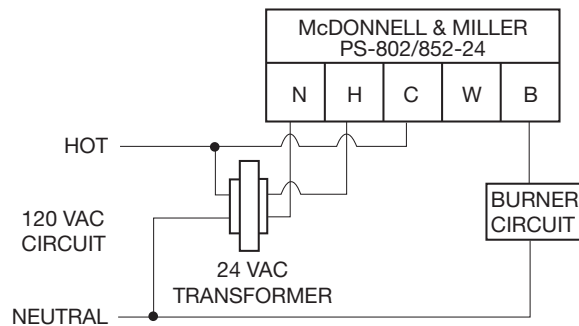
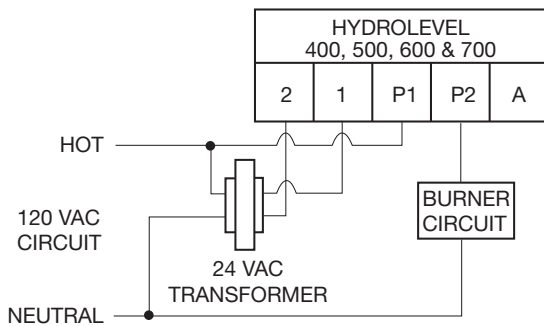
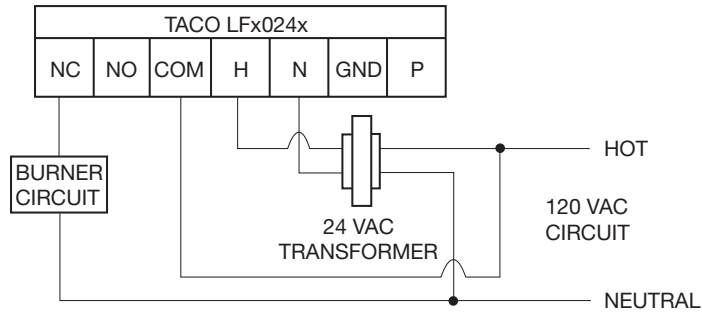


# Taco LF Series 24 Volt LWCO Competitive Wiring Cross Reference

## 24 VAC Models with 24 VAC Burner Circuits

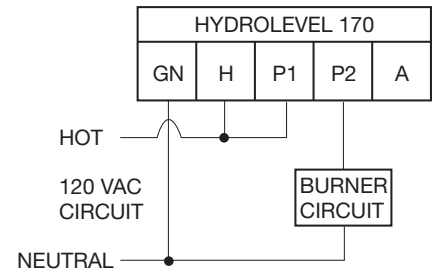
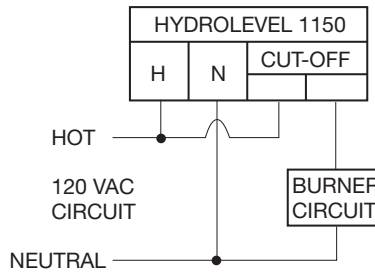
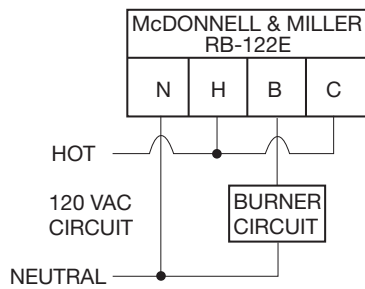
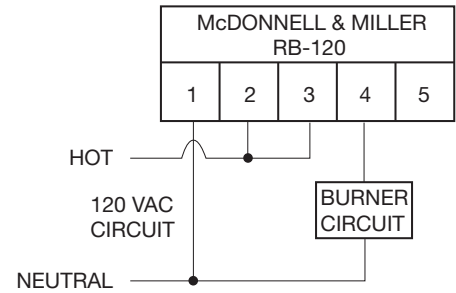
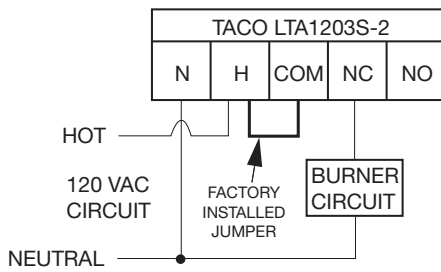


## 24 VAC Models with 120 VAC Burner Circuits

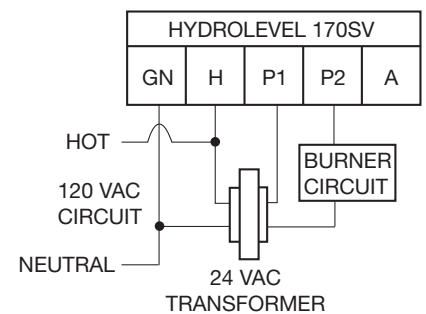
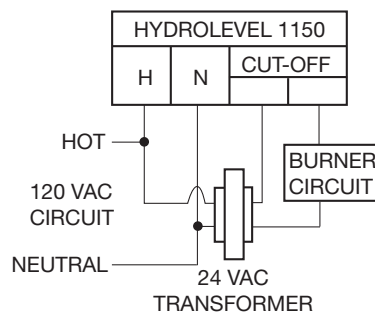
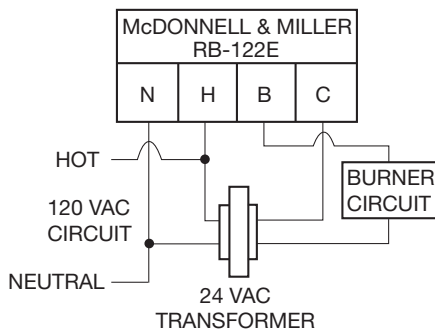
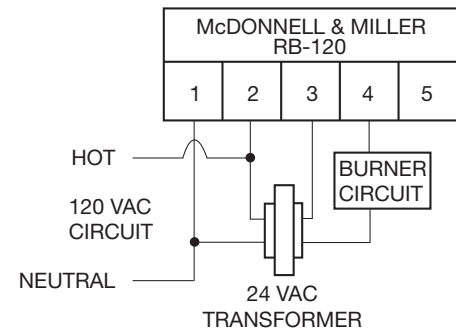
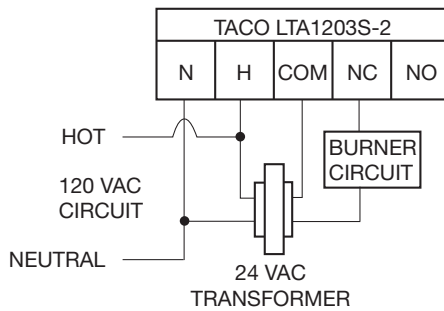


# Taco LTA-2 Series 120 Volt LWCO Competitive Wiring Cross Reference

## 120 VAC Models with 120 VAC Burner Circuits

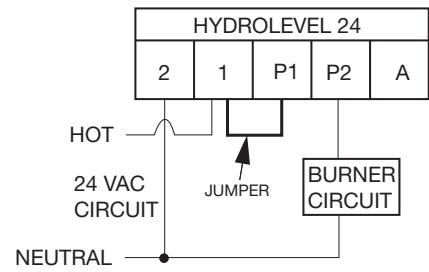
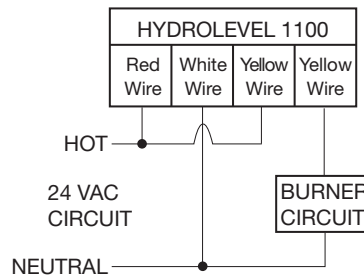
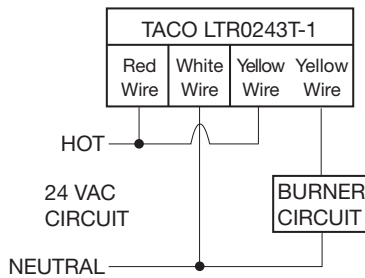
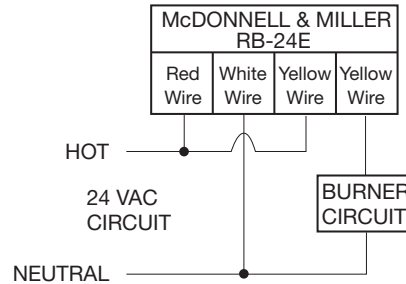
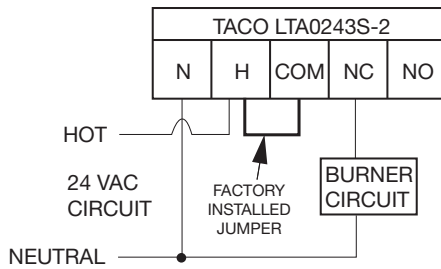


## 120 VAC Models with 24 VAC Burner Circuits

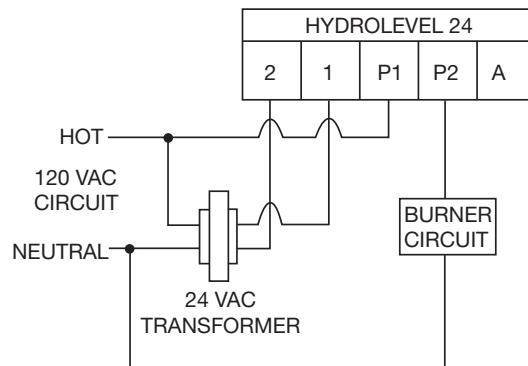
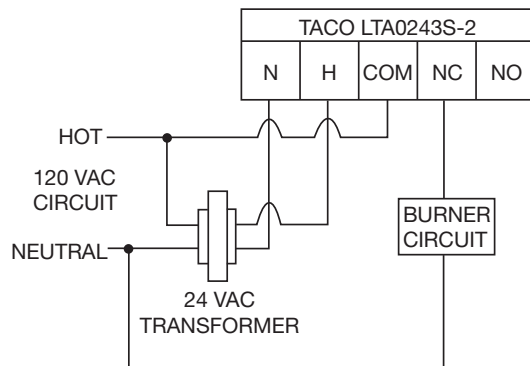


# Taco LTR and LTA-2 Series 24 Volt LWCO Competitive Wiring Cross Reference

## 24 VAC Models with 24 VAC Burner Circuits



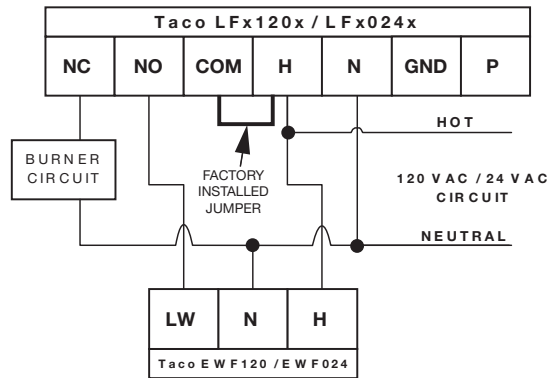
## 24 VAC Models with 120 VAC Burner Circuits





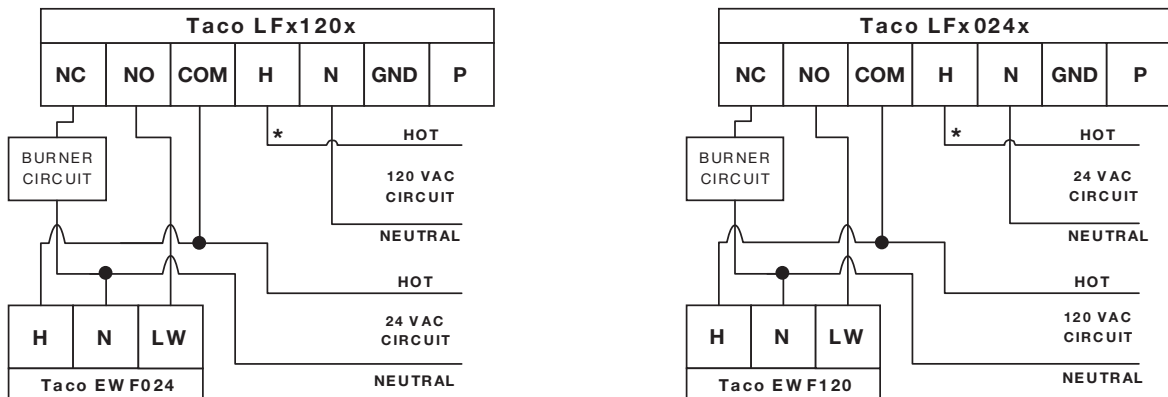
## Wiring Taco LF Series Low Water Cutoffs to Taco Electric Water Feeder with the Same Voltages

### EWF Standard Wiring



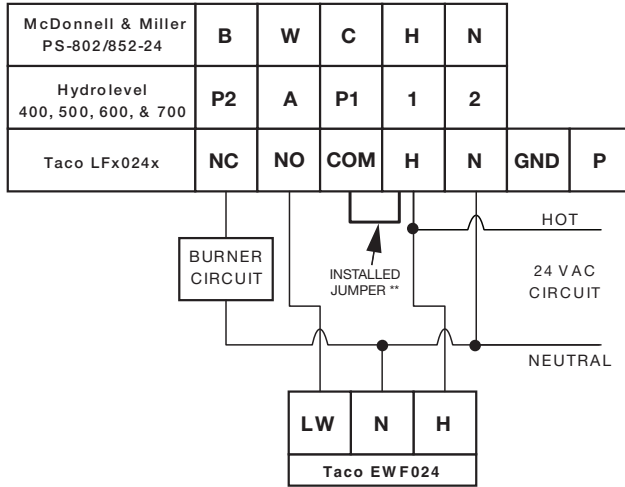
## Wiring Taco LF Series Low Water Cutoffs to Taco Electric Water Feeder with Different Burner Voltages

### EWF Alternate Wiring



\* NOTE: Remove factory installed  
jumper between H and COM terminals

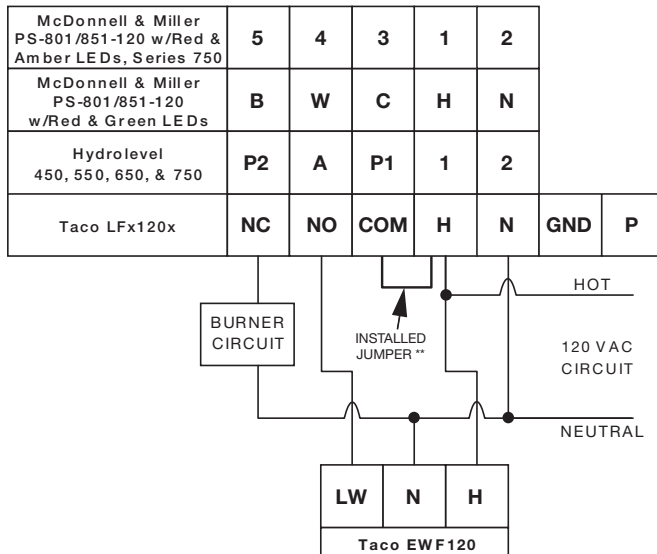
## Wiring Taco 24VAC Electric Water Feeder to Taco LF Series 24VAC Low Water Cutoff or 24VAC McDonnell & Miller or Hydrolevel Low Water Cutoffs



\*\* May be factory installed on some LWCOs

NOTE: Wiring shown only for control and burner circuits of the same voltage. Some terminal designations are not in their actual order on the LWCOs.

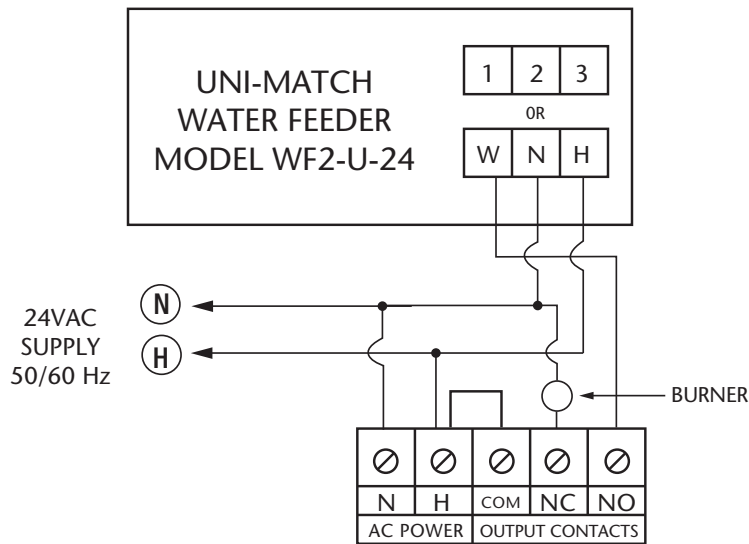
## Wiring Taco 120VAC Electric Water Feeder to Taco LF Series 120VAC Low Water Cutoff or 120VAC McDonnell & Miller or Hydrolevel Low Water Cutoffs



\*\* May be factory installed on some LWCOs

NOTE: Wiring shown only for control and burner circuits of the same voltage. Some terminal designations are not in their actual order on the LWCOs.

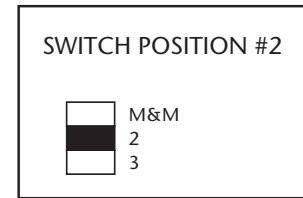
## Wiring TACO LTA-2 or LF Series 24VAC Low Water Cutoff to McDonnell & Miller Series WF2 Uni-Match Electric Water Feeder



### 24 VAC LWCO Using Burner Circuit Power Source

Remove jumper between H and COM if using power source other than burner circuit or when using mixed voltages.

Do not connect feeder to a manual reset LWCO.



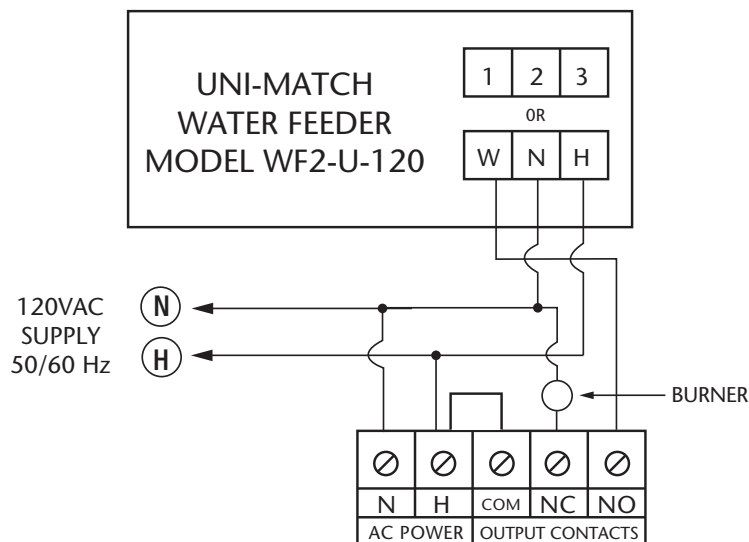
Note on switch position:

Switch setting 1 (M&M), the feed cycle repeats indefinitely. Position 2 and 3 gives one feed cycle.

If using the LTA-2 series, choose whichever position best matches the application:

- WF-2 switch to position 1
  - 60 sec. delay, 90 sec. feed, repeats
- WF-2 switch to position 2
  - 90 sec. delay, 90 sec. feed
- WF-2 switch to position 3
  - 100 sec. delay, 90 sec. feed

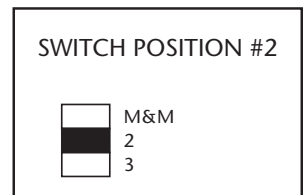
## Wiring TACO LTA-2 or LF Series 120VAC Low Water Cutoff to McDonnell & Miller Series WF2 Uni-Match Electric Water Feeder



### 120 VAC LWCO Using Burner Circuit Power Source

Remove jumper between H and COM if using power source other than burner circuit or when using mixed voltages.

Do not connect feeder to a manual reset LWCO.



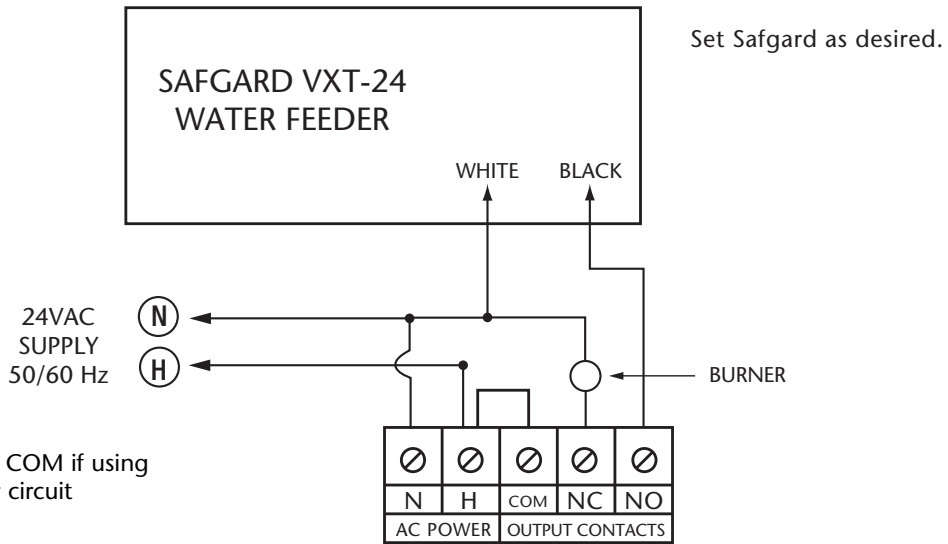
Note on switch position:

Switch setting 1 (M&M), the feed cycle repeats indefinitely. Position 2 and 3 gives one feed cycle.

If using the LTA-2 series, choose whichever position best matches the application:

- WF-2 switch to position 1
  - 60 sec. delay, 90 sec. feed, repeats
- WF-2 switch to position 2
  - 90 sec. delay, 90 sec. feed
- WF-2 switch to position 3
  - 100 sec. delay, 90 sec. feed

## Wiring TACO LF Series 24VAC Low Water Cutoff to Hydrolevel VXT-24 Water Feeder (Non-Display Model)

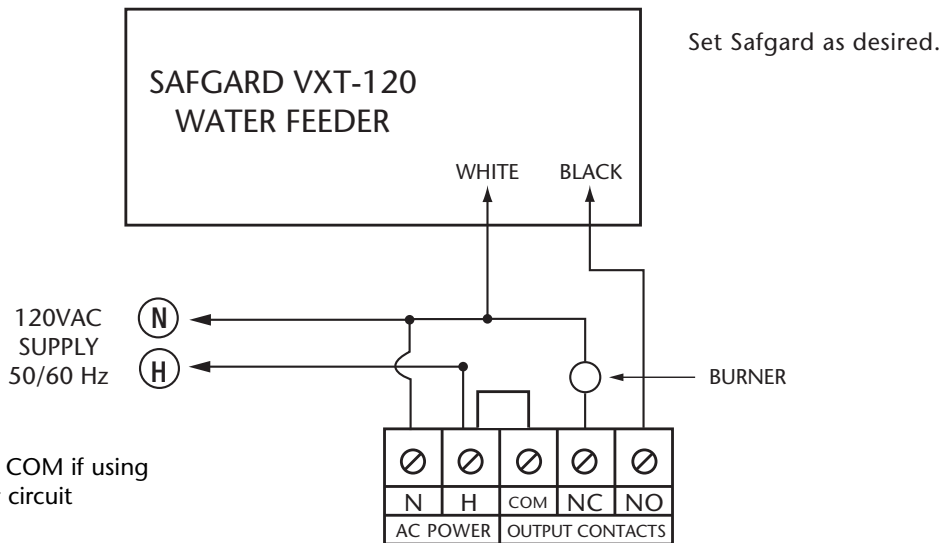


Remove jumper between H and COM if using power source other than burner circuit or when using mixed voltages.

Do not connect feeder to a manual reset LWCO.

### 24 VAC LWCO Using Burner Circuit Power Source

## Wiring TACO LF Series 120VAC Low Water Cutoff to Hydrolevel VXT-120 Water Feeder (Non-Display Model)

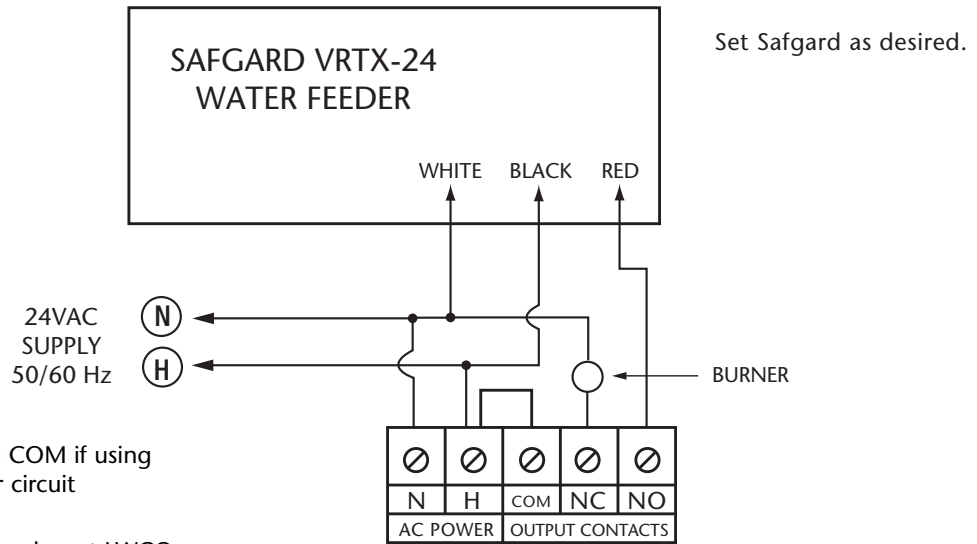


Remove jumper between H and COM if using power source other than burner circuit or when using mixed voltages.

Do not connect feeder to a manual reset LWCO.

### 120 VAC LWCO Using Burner Circuit Power Source

## Wiring TACO LTA-2 or LF Series 24VAC Low Water Cutoff to Hydrolevel VXT-24 Programmable Water Feeder (Model with Display)

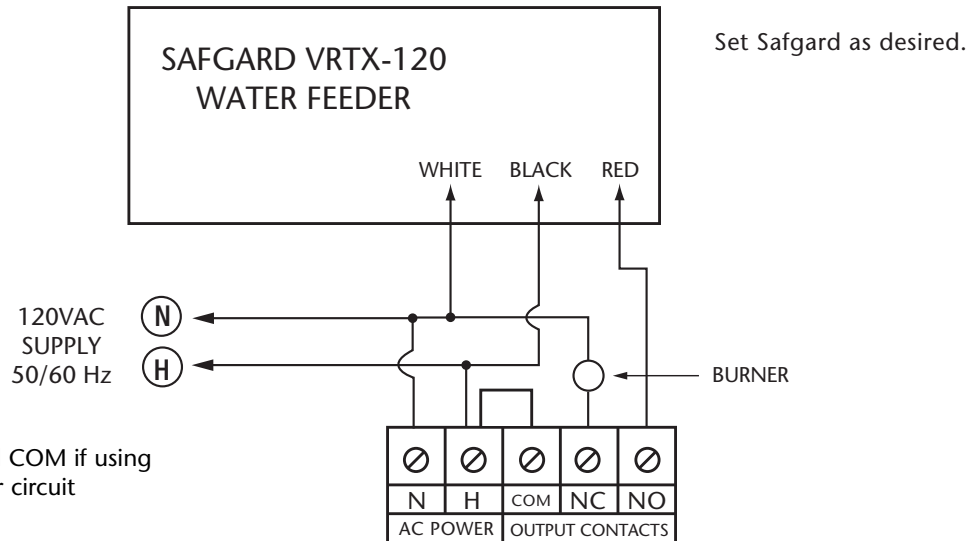


Remove jumper between H and COM if using power source other than burner circuit or when using mixed voltages.

Do not connect feeder to a manual reset LWCO.

### 24 VAC LWCO Using Burner Circuit Power Source

## Wiring TACO LTA-2 or LF Series 120VAC Low Water Cutoff to Hydrolevel VXT-120 Programmable Water Feeder (Model with Display)



Remove jumper between H and COM if using power source other than burner circuit or when using mixed voltages.

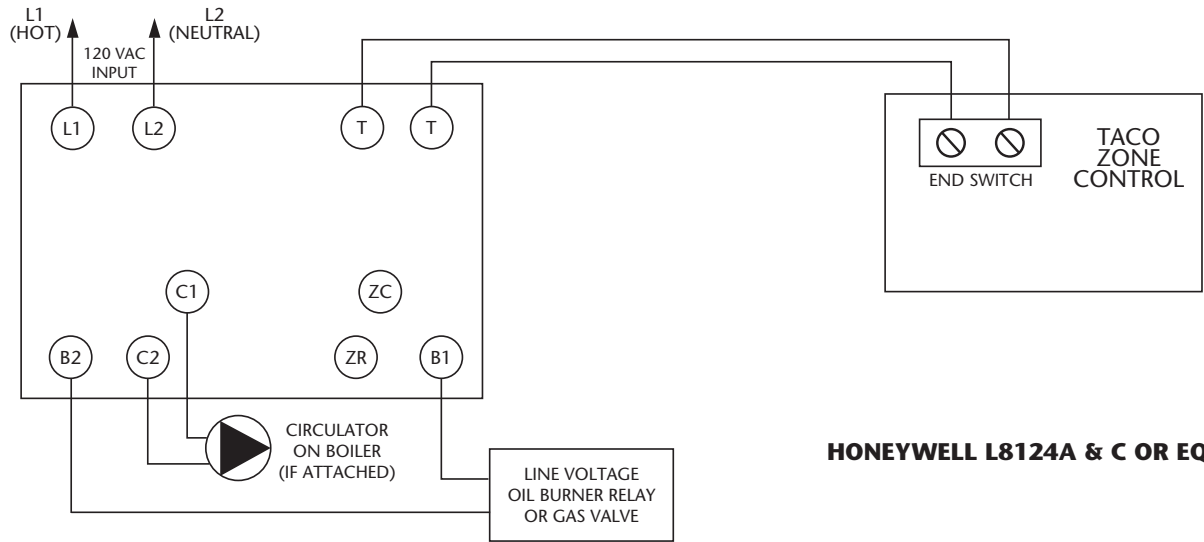
Do not connect feeder to a manual reset LWCO.

### 120 VAC LWCO Using Burner Circuit Power Source

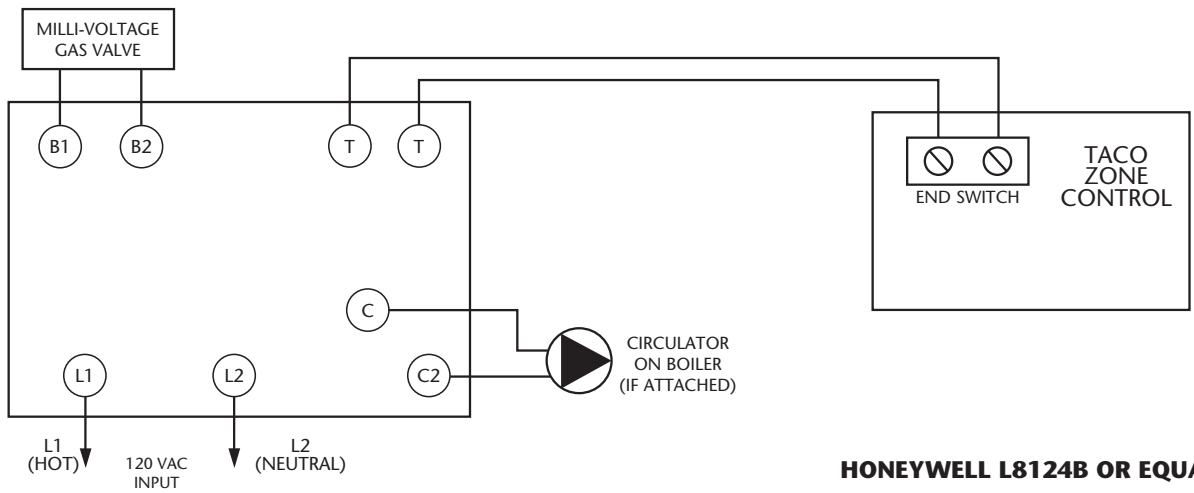
**Taco LTR, LN, LT-1, LTA-2 & LF Series Low Water Cutoff and Taco Electric Water Feeder Wiring Cross Reference**

Manufacturer	Device or Series	Power Connections		Output Contacts			Remote Probes	
		Hot	Neutral	Common	To Burner Circuit	To EWF's LW Terminal/Alarm	Probe	Probe Preference
Taco	LF & LT-1 Series	H	N	COM	NC	NO	P	GND
Taco	LTA-2 & LN Series	H	N	COM	NC	NO	—	—
Taco	LTR Series	Red Wire	White Wire	Yellow Wire	Yellow Wire	—	—	—
McDonnell & Miller	PS-801/851 (Older Models w/Red & Amber LEDs)	1	2	3	5	4	P or J2	Chassis GND
McDonnell & Miller	PS-801/851 (New Models w/Red & Green LEDs)	H	N	C	B	W	J2	Chassis GND
McDonnell & Miller	PS-802/852 (Older Models w/Red & Amber LEDs)	H	N	C	B	W	J7	Chassis GND
McDonnell & Miller	PS-802/852 (Older Models w/Red & Green LEDs)	H	N	C	B	W	J3	Chassis GND
McDonnell & Miller	Series 750	1	2	3	5	4	P	Chassis GND
McDonnell & Miller	RB-122	H (Black Wire)	N (White Wire)	C (Yellow Wire)	B (Yellow Wire)	—	—	—
McDonnell & Miller	RB-120	1	2	3	4	5	—	—
McDonnell & Miller	RB-24	Red Wire	White Wire	Yellow Wire	Yellow Wire	—	—	—
Hydrolevel	24	1	2	P1	P2	A	—	—
Hydrolevel	170	H	GN	P1	P2	A	—	—
Hydrolevel	1100	Red Wire	White Wire	Yellow Wire	Yellow Wire	—	—	—
Hydrolevel	1150	H (Black Wire)	N (White Wire)	CUT-OFF (Yellow Wire)	CUT-OFF (Yellow Wire)	—	—	—
Hydrolevel	400, 500, 600, 700, 450, 550, 650, 750	1	2	P1	P2	A	H3	Chassis GND
Hydrolevel	RW700 Series (Except RW700A1098)	L1	L2	—	B	A	2 Red Wires, White Wire	Green Wire
Hydrolevel	RW700A1098	T1	T2	—	B	A	2 Red Wires, White Wire	Green Wire

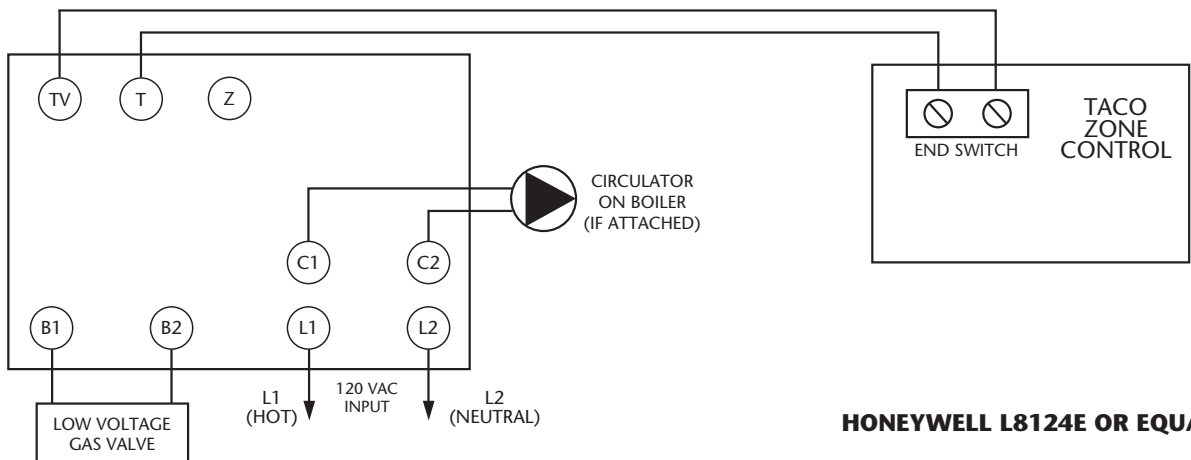
# Aquastat Wiring



**HONEYWELL L8124A & C OR EQUAL**

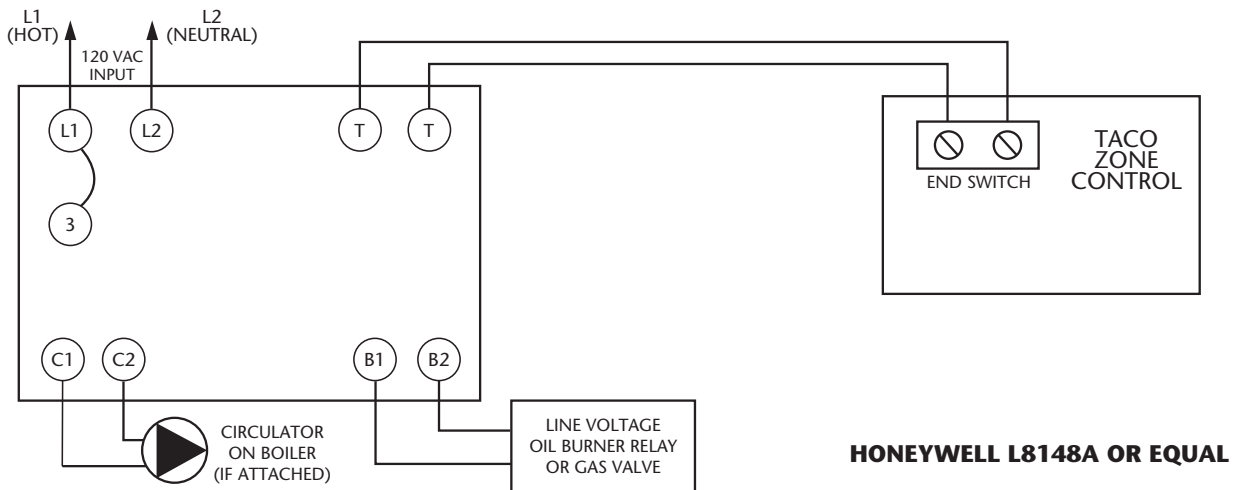
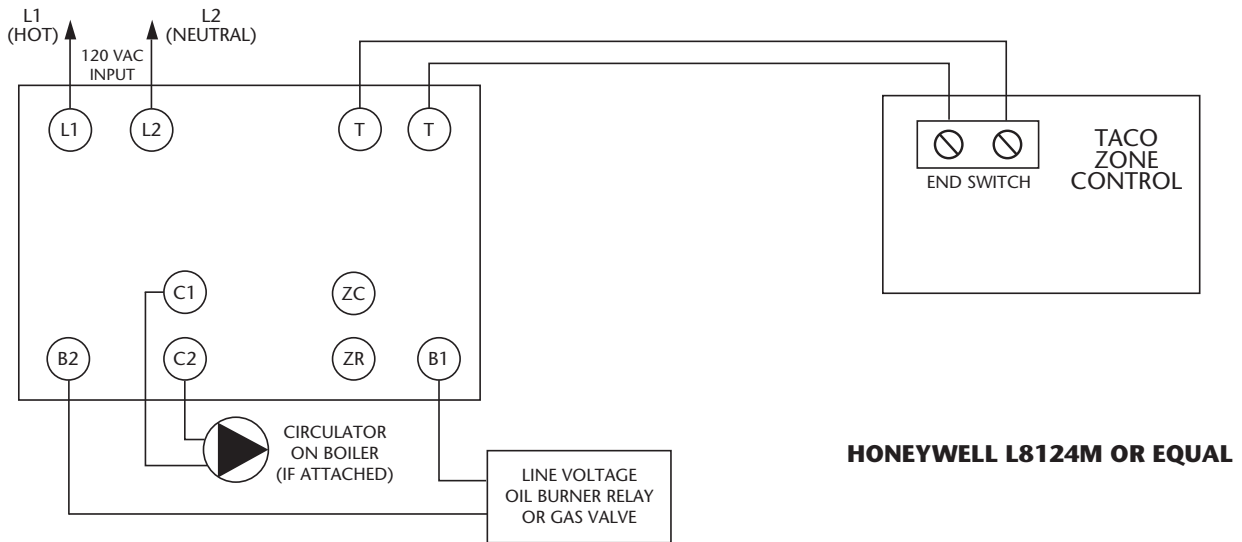
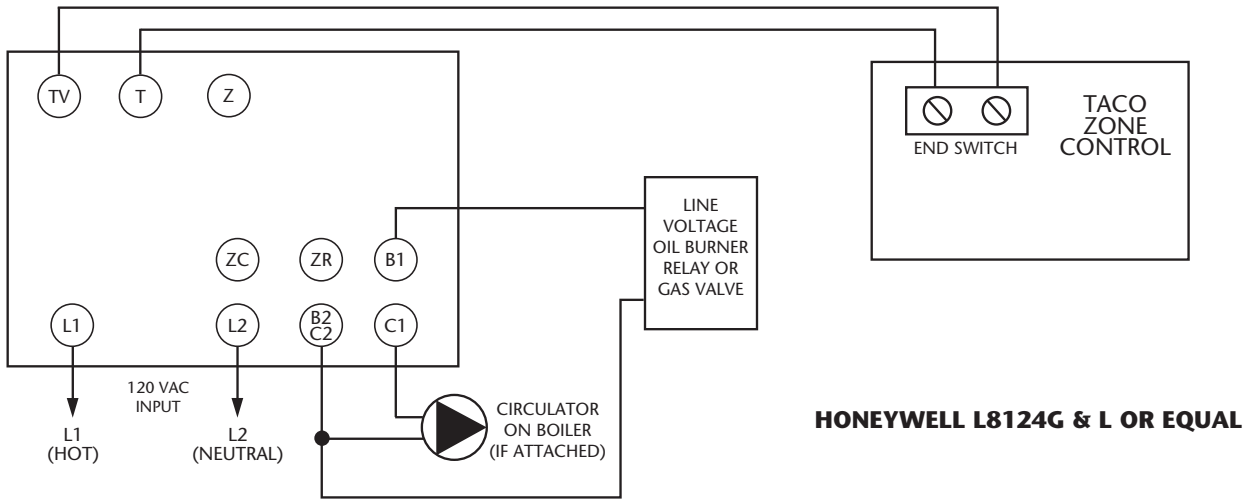


**HONEYWELL L8124B OR EQUAL**



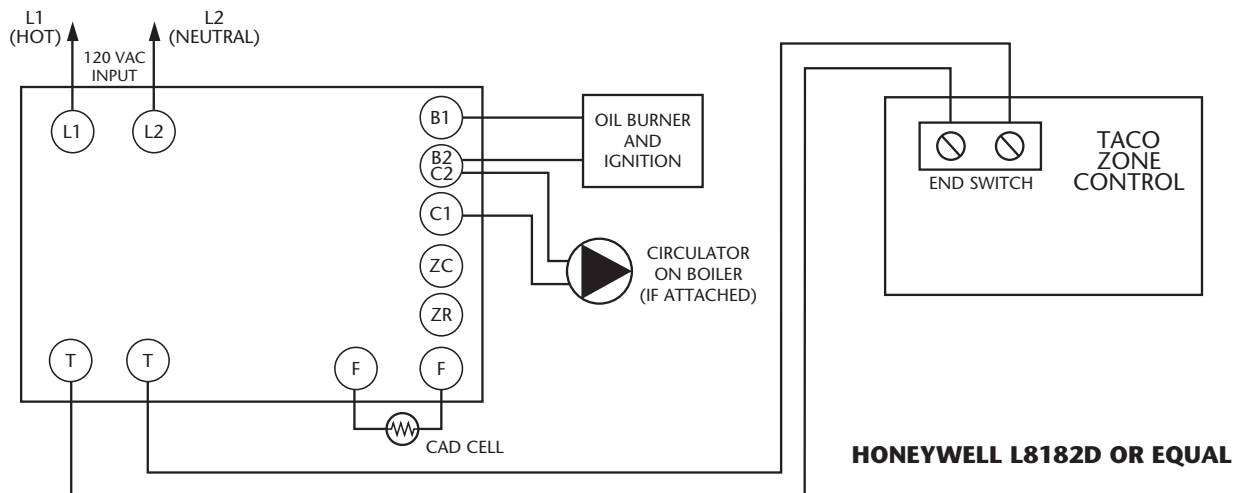
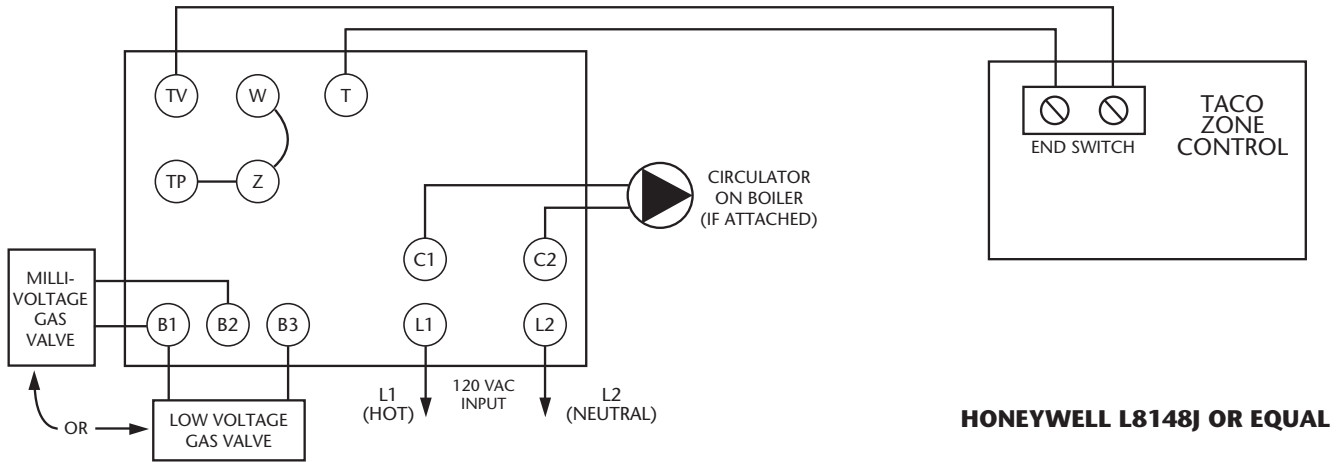
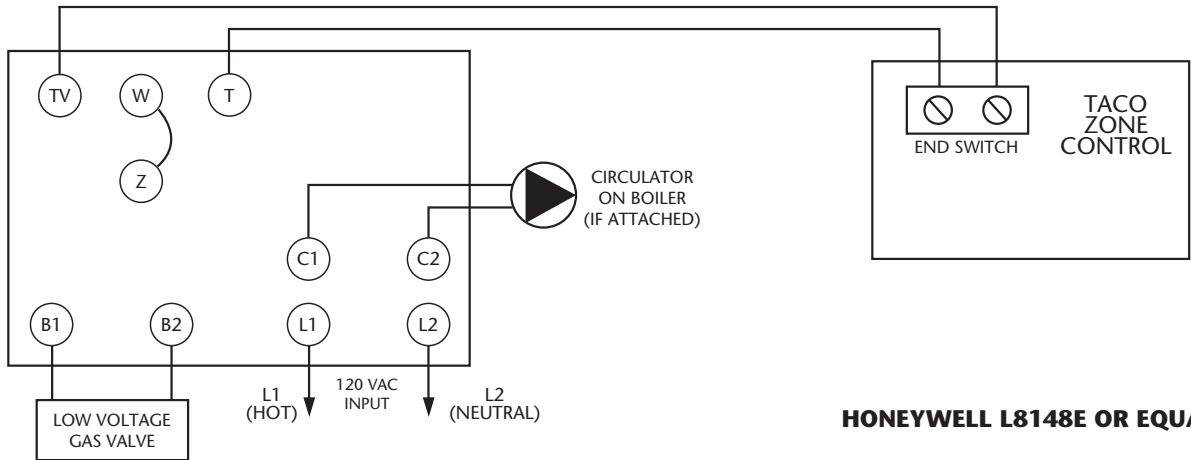
**HONEYWELL L8124E OR EQUAL**

# Aquastat Wiring

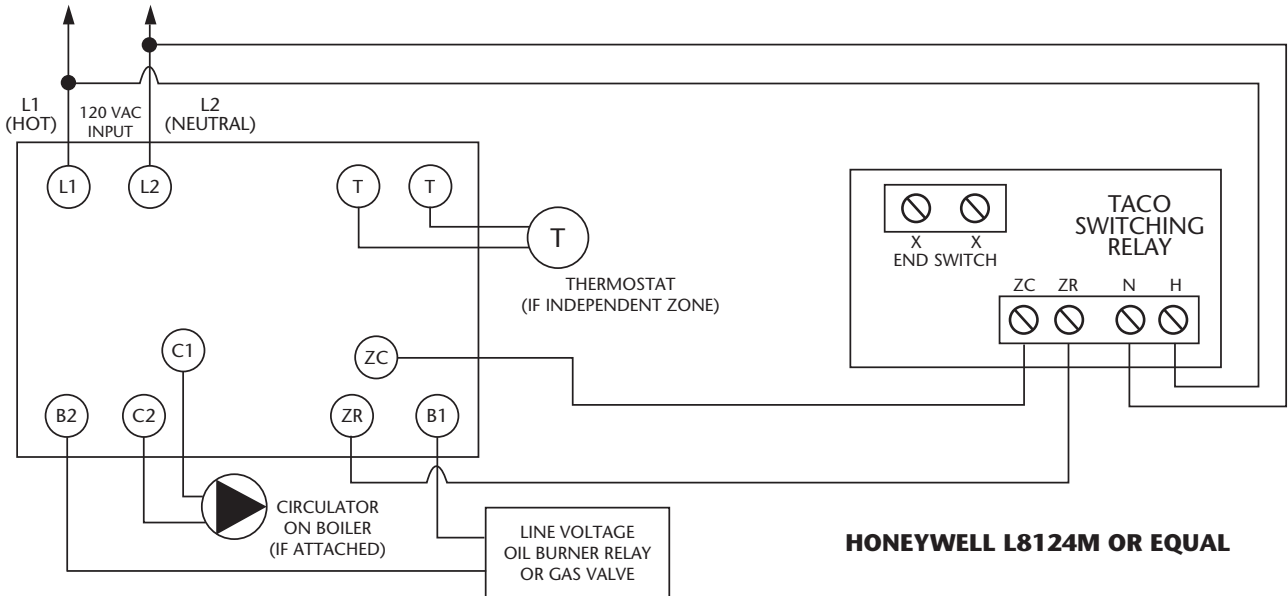
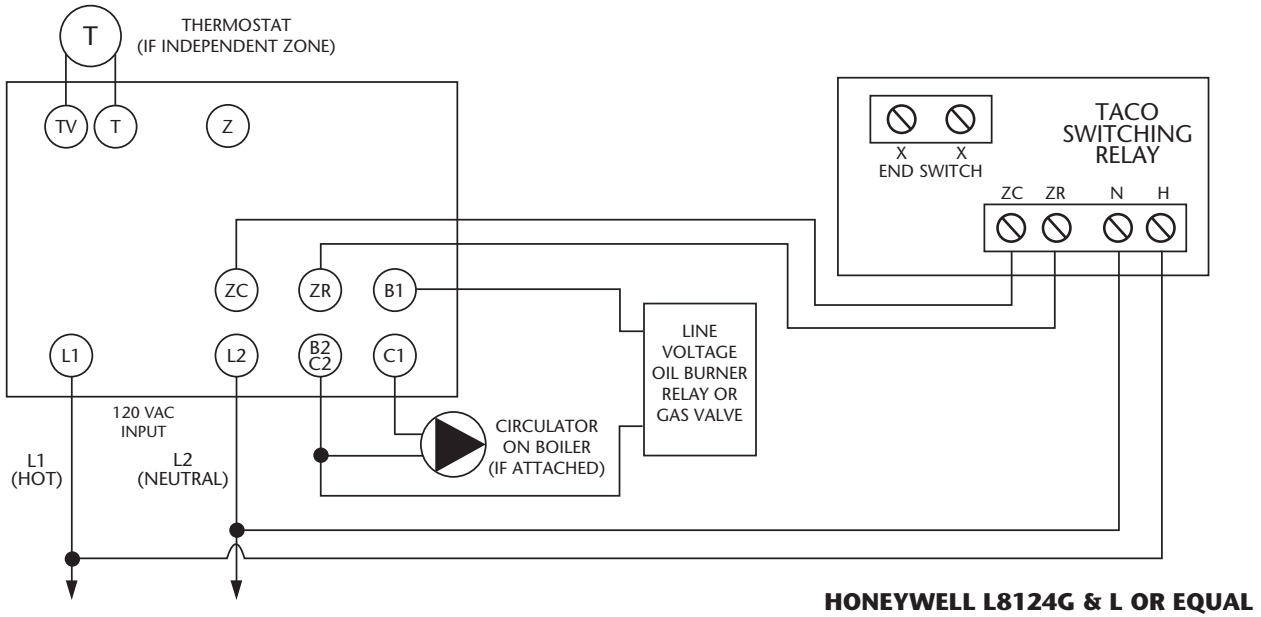
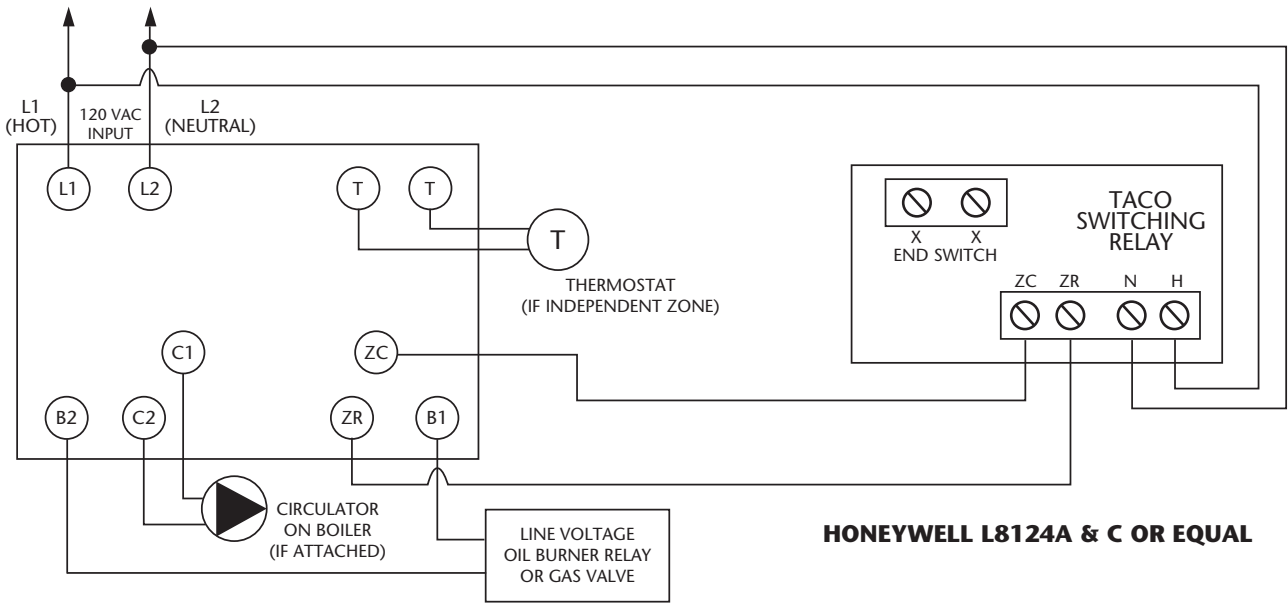




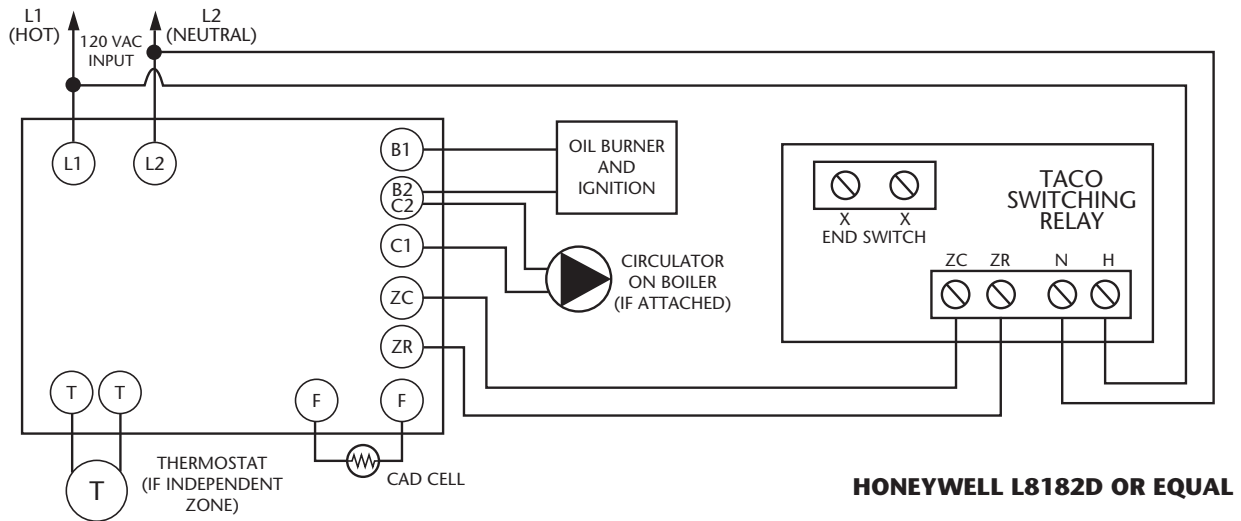
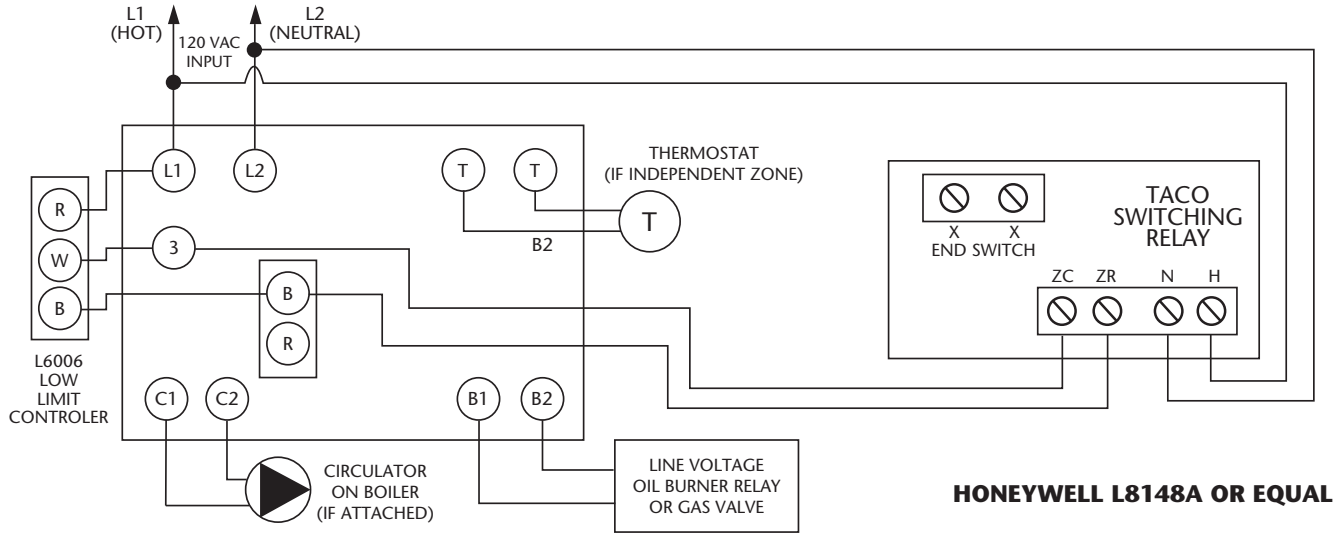
# Aquastat Wiring



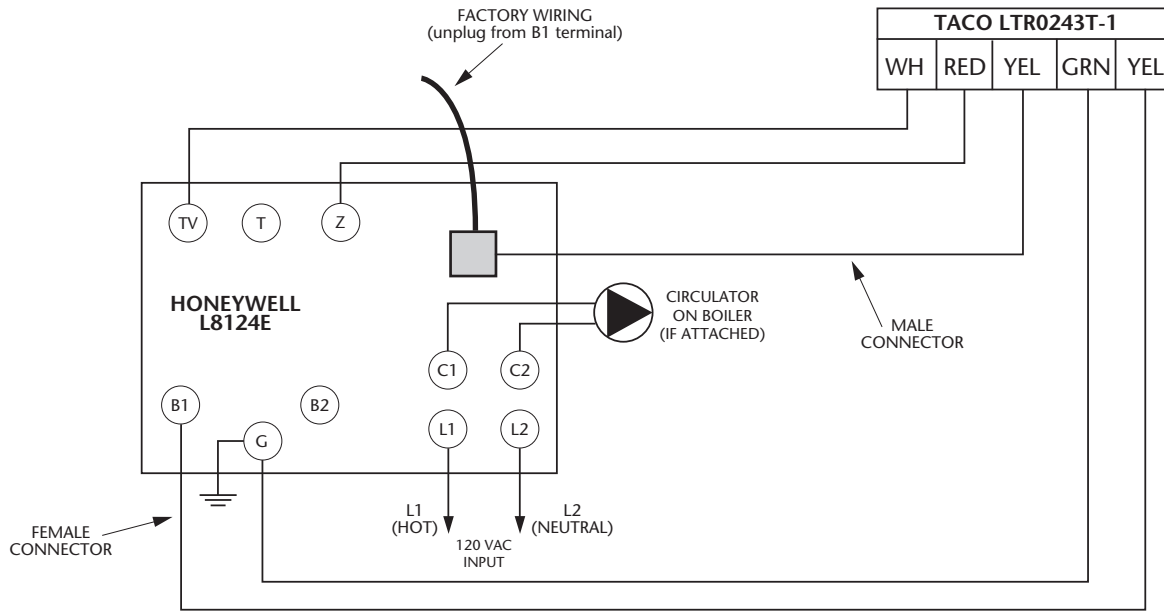
# Aquastat Wiring



# Aquastat Wiring

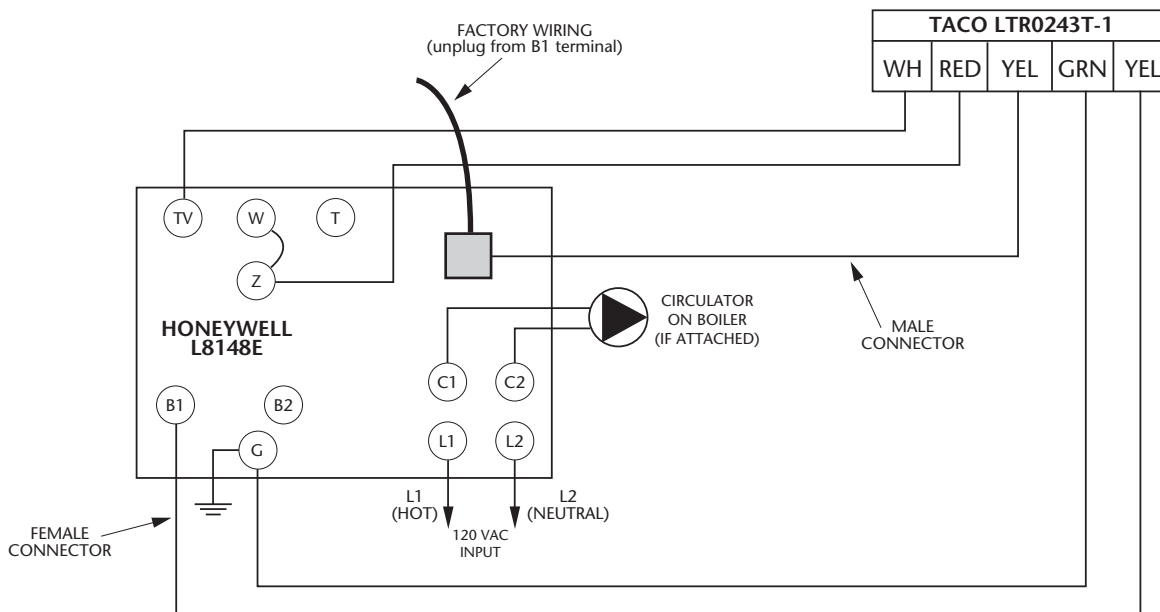


## Wiring for Boilers with Honeywell Aquastat Model L8124E or Equivalent



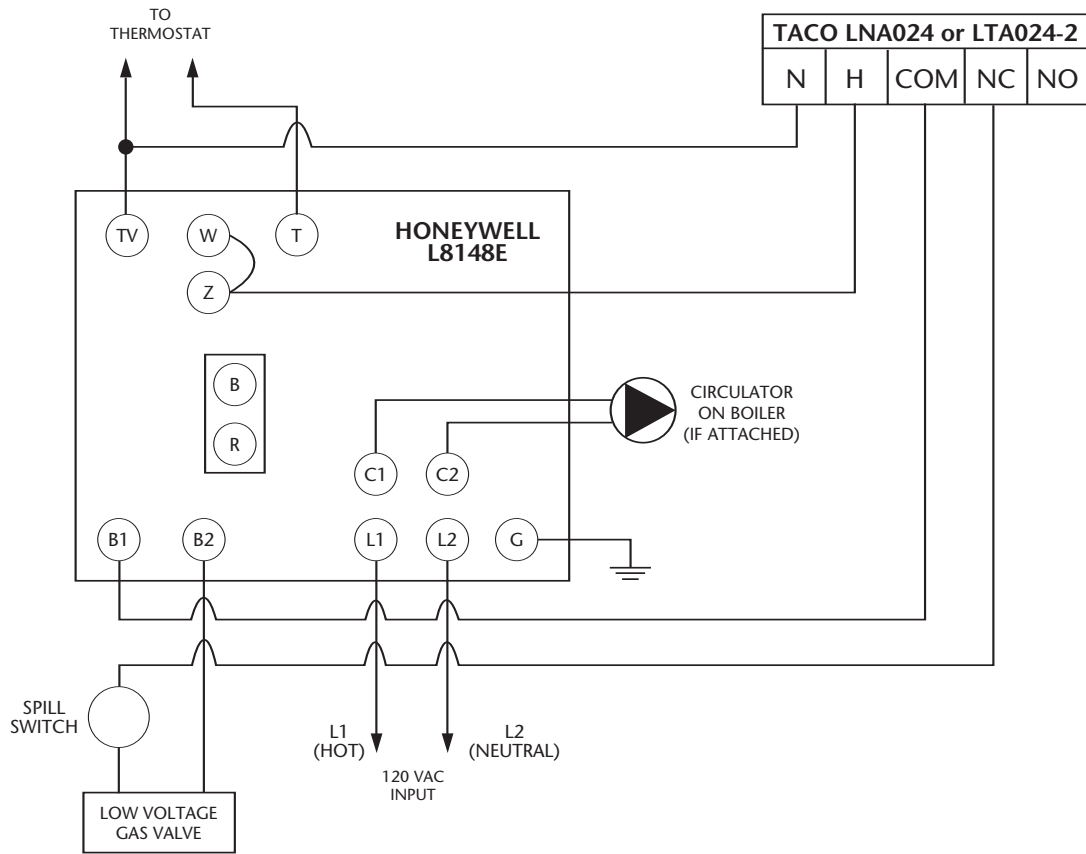
NOTE: The green wire must be connected to a ground source electrically common to the boiler ground.

## Wiring for Boilers with Honeywell Aquastat Model L8148E or Equivalent

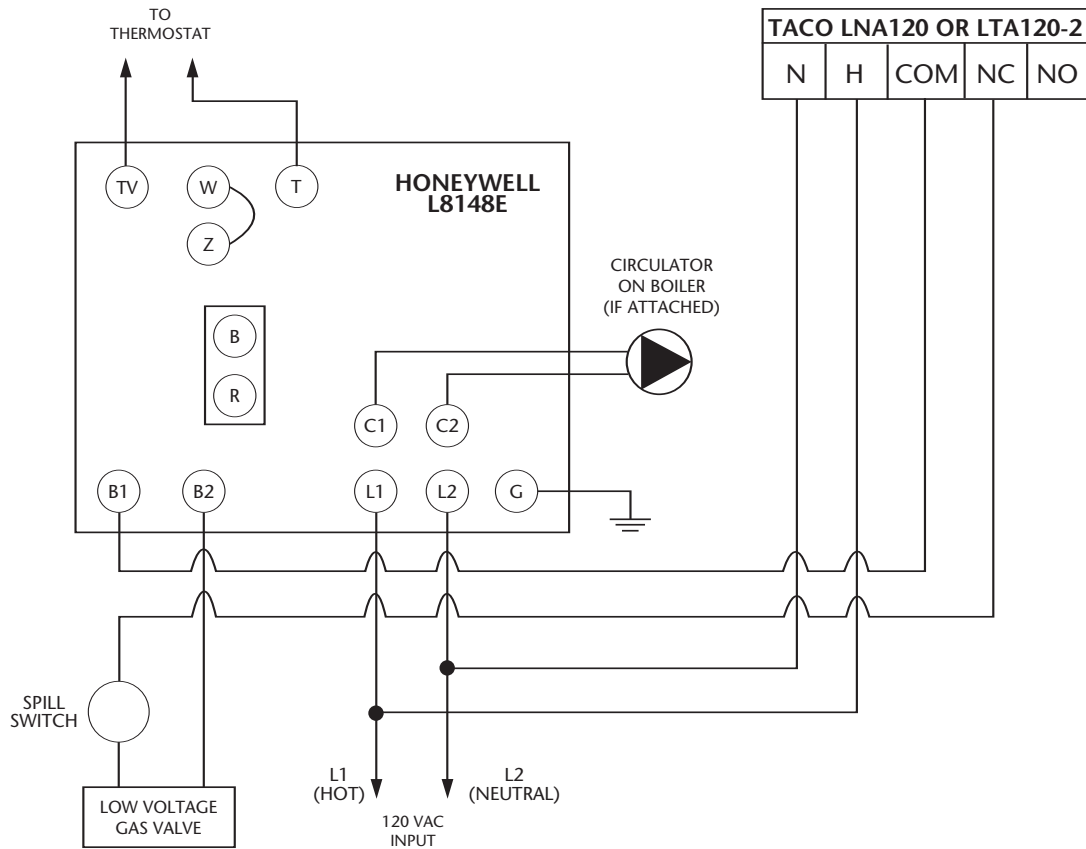


NOTE: The green wire must be connected to a ground source electrically common to the boiler ground.

## Aquastat Wiring to 24VAC Low Water Cutoff



## Aquastat Wiring to 120VAC Low Water Cutoff





# Instruction Sheet

## SR501-4 Switching Relay

### Features:

- External Indicator Lights
- Universal Replaceability
- Snap-in PC Board
- Simplified Wiring
- Sealed Relays
- Fuse Protected Outputs
- 100% Factory Tested
- Contractor Friendly PC Board Layout
- Universal Thermostat Compatibility
- UL Approved
- Extended 3 Year Warranty
- Made in the USA

### Operation:

Connect a thermostat to the "T T" terminals on the switching relay. When the thermostat calls for heat, the relay is energized and power is given to the circulator.

### Power Input:

Connect 120 volt ac power to terminals N and H.

### Jumper Placement:

The jumper is factory installed between terminals H and 3 to switch power on terminals 4 n/o and 4 n/c.

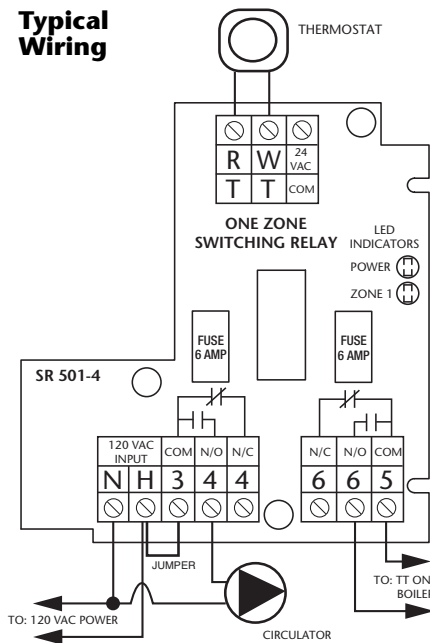
### External Diagnostics:

The External lights show full functionality of the switching relay. The green light should always be on, indicating that power is connected. When the thermostat calls for heat, both the appropriate circulator and red indicating light is energized.

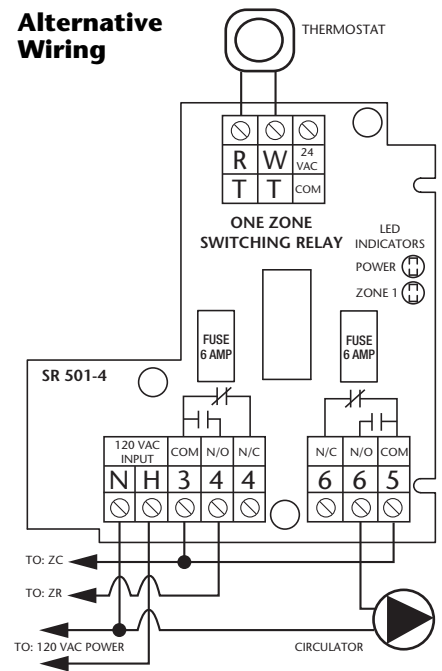
### The Taco Connection:

Combine the reliability of the Taco Zone Valves, Priority Zoning Circulators, Thermostats, and the "00" family of circulators with the advanced features of the Taco Zone Controls to achieve total system integration. No matter the application, Taco now provides the products to maximize system performance while simplifying both installation and service.

### Typical Wiring



### Alternative Wiring



**NOTE:** When using Alternative Wiring diagram, the boiler operating control's ZC terminal will see the load of the circulator(s).

**WARNING:** When using Alternative Wiring diagram, wiring instructions must be followed so power originates from the boiler aquastat. Failure to follow these wiring instructions may result in a secondary source of power being connected to the boiler that may activate it under certain circumstances, causing injury or death.

**WARNING:** Wiring connections must be made in accordance with all applicable electrical codes. Use copper wire only. 120 VAC wiring must have a minimum temperature rating of 75°C. Failure to follow this instruction can result in personal injury or death and/or property damage. 12-18 gauge wire recommended for 120 VAC connections, 14-22 gauge wire for thermostat connections, and 14-22 gauge wire for 24 VAC source connections.

### Specifications:

PRODUCT NUMBER	NUMBER OF ZONES	INPUT VOLTAGE	MAXIMUM COMBINED LOAD	TYPE 1 ENCLOSURE WIDTH	HEIGHT	DEPTH
SR501-4	1	120/60/1 VAC	12 amps	4 7/8"	6 5/8"	2 3/8"

All circulator relay connections, including ZC/ZR, are rated 1/3 hp (6 FLA, 36 LRA) at 120 VAC. The thermostat connection supplies a 24 VAC class 2 output.

### Terminal Description:

- T & T Thermostat Connection
- COM Common side of transformer, to power some setback thermostats
- N Neutral wire of power input
- H Hot wire of power input
- 3 Common terminal for 4 n/o and 4 n/c
- 4 n/o Normally open terminal
- 4 n/c Normally closed terminal
- 6 n/c Normally closed terminal
- 6 n/o Normally open terminal
- 5 Common terminal for 6 n/o and 6 n/c

### TACO SR501-4 REPLACEMENT CROSS-REFERENCE

MANUFACTURER	MODEL	CONNECTIONS										
Taco	SR501-4	H	N	3	4 NO	4 NC	5	6 NO	6 NC	R/T	W/T	C
Argo	AR821	1	2	3	4		5	6		T		
	AR822	L1	L2	3	4 NO	4 NC	5	6 NO	6 NC	R/T	G/T	C
Colombus	MR10	L1	L2	3	4 NO	4 NC	5	6 NO	6 NC	R/T	G/T	C
Erie	SR100	L1	N	3	4 NO	4 NC	5	6 NO	6 NC	R/T	G/T	C
Honeywell	RA89A	1	2	3	4					T	T	
	RA832A	1	2	3	4		X	X		T	T	
	R845A	1	2	3	4		5	6		T	T	
White-Rogers	889-189	1	2	3	4					T	T	
	829-845	1	2	3	4		5	6		T	T	

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

**Do it Once. Do it Right.®**

TACO, INC., 1160 Cranston Street, Cranston, RI 02920 Telephone: (401) 942-8000 FAX: (401) 942-2360.  
TACO (Canada), Ltd., 8450 Lawson Road, Unit #3, Milton, Ontario L9T 0J8. Telephone: 905/564-9422. FAX: 905/564-9436.

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# Instruction Sheet

## SR501-HC-4 Switching Relay, High Current

### Features:

- External Indicator Lights
- Simplified Wiring
- Sealed Relays
- 100% Factory Tested
- Contractor Friendly PC Board Layout
- Universal Thermostat Compatibility
- UL Approved
- Extended 3 Year Warranty
- Made in the USA

### 120 VAC Application:

1 zone switching relay with boiler enable or 2 zone without boiler enable.

### 240 VAC Application:

1 zone switching relay when switching both of the circulator hot leads (L1 & L2).

### Operation:

Connect a thermostat to the R & W1 and/or W2 terminals on the switching relay. When the thermostat(s) call for heat, the relays are energized and power is given to the circulator(s).

### Zone Control Power Input:

Connect 120 volt AC power input to terminals N and H. Neutral wire to terminal N. Hot wire to terminal H.

### External Diagnostics:

The external lights show full functionality of the switching relay. The green light should always be on, indicating that power is connected. When either thermostat calls for heat, both the appropriate relay and red indicating light are energized.

### The Taco Connection:

Combine the reliability of the Taco Zone Valves, Priority Zoning Circulators, Thermostats, and the "00" family of circulators with the advanced features of the Taco Zone Controls to achieve total system integration. No matter the application, Taco now provides the products to maximize system performance while simplifying both installation and service.

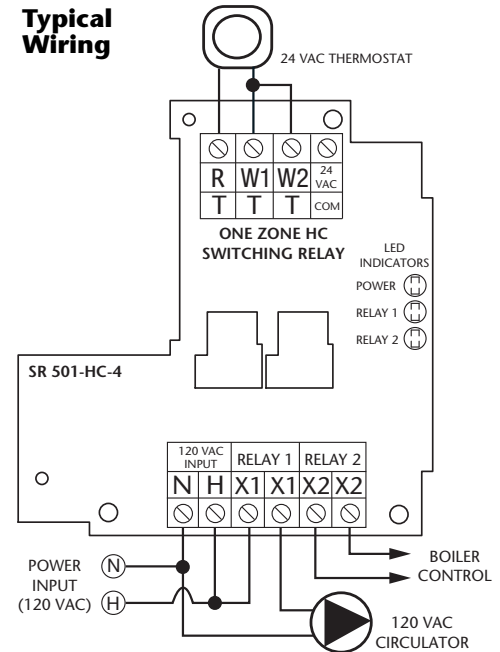
### Terminal Description:

- R Hot side of transformer. Connect to R on thermostat.
- W1 Switched R signal from thermostat #1. Connect to W on thermostat.
- W2 Switched R signal from thermostat #2. Connect to W on thermostat.
- C Common side of transformer. Connect to COM on thermostat (optional).
- N Neutral wire of power input.
- H Hot wire of power input.
- X1 Dry contacts for relay 1 (W1).
- X1 Dry contacts for relay 1 (W1).
- X2 Dry contacts for relay 2 (W2).
- X2 Dry contacts for relay 2 (W2).

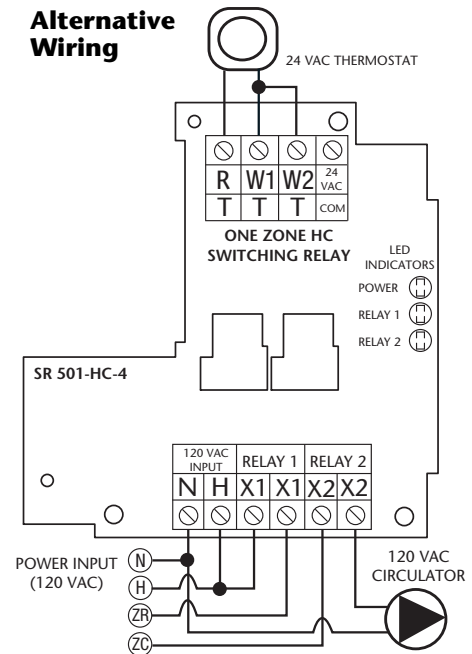
### Specifications:

PRODUCT NUMBER	NUMBER OF ZONES	INPUT VOLTAGE	WIDTH	TYPE 1 ENCLOSURE HEIGHT	DEPTH
SR501-HC-4	1 or 2	120/60/1 VAC, 0.84 MA	4 <sup>7</sup> / <sub>8</sub> "	6 <sup>5</sup> / <sub>8</sub> "	2 <sup>3</sup> / <sub>8</sub> "
RELAY RATING: 1/3 HP (13.8 FLA, 82.8 LRA at 120 VAC) (6.9 FLA, 41.4 LRA at 240 VAC)					
The thermostat connection supplies a 24 VAC class 2 output.					

### Typical Wiring



### Alternative Wiring

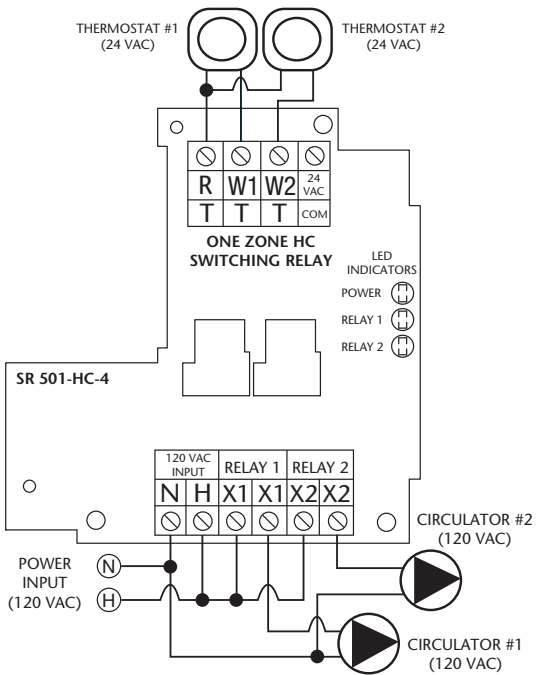


**NOTE:** When using Alternative Wiring diagram, the boiler operating control's ZC terminal will see the load of the circulator(s).

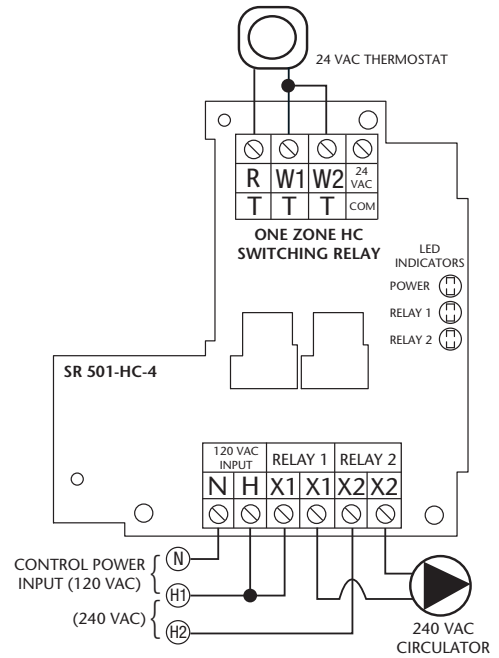
**WARNING:** When using Alternative Wiring diagram, wiring instructions must be followed so power originates from the boiler aquastat. Failure to follow these wiring instructions may result in a secondary source of power being connected to the boiler that may activate it under certain circumstances, causing injury or death.

**WARNING:** Wiring connections must be made in accordance with all applicable electrical codes. Use copper wire only. Failure to follow this instruction can result in personal injury or death and/or property damage. 12-18 gauge wire recommended for 120/240 VAC connections, 14-22 gauge wire for thermostat connections, and 14-22 gauge wire for 24 VAC source connections.

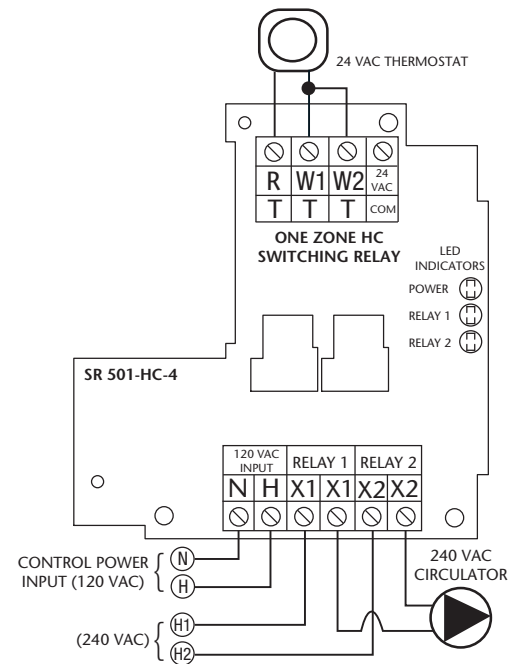
# SR501-HC-4 Switching Relay Instruction Sheet (page 2)



**TWO ZONE, NO BOILER ENABLE**



**ONE ZONE, NO BOILER ENABLE  
(CONTROL & CIRCULATOR SAME POWER SOURCE)**



**ONE ZONE, NO BOILER ENABLE  
(CONTROL & CIRCULATOR DIFFERENT POWER SOURCE)**

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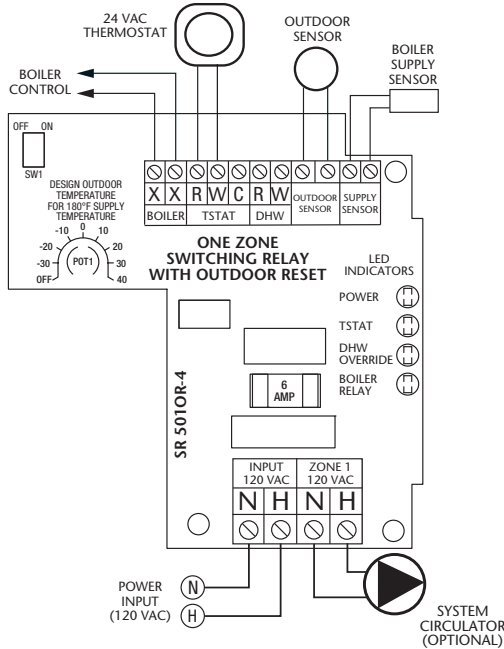
# Instruction Sheet

## SR501-OR-4 Switching Relay with Outdoor Reset

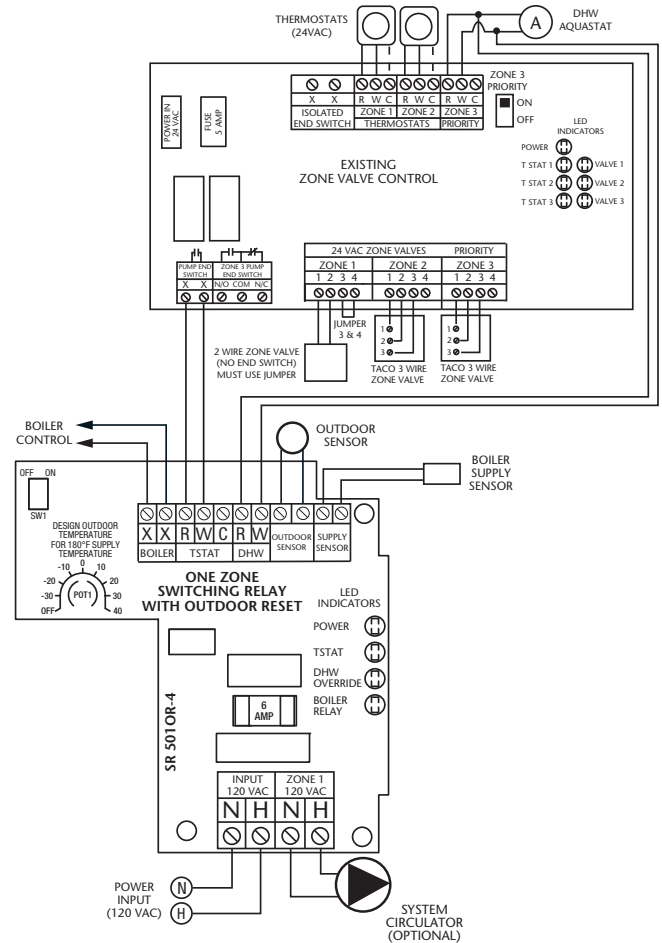
### APPLICATION:

The SR501-OR is a microprocessor-based control designed to regulate the supply water temperature of a single boiler, based on the outdoor temperature. The SR501-OR is a boiler reset control and switching relay in one unit. The SR501-OR is ideal for retrofit application, but may also be used in new installations as well.

The SR501-OR includes functions such as automatic reset ratio calculation, warm weather shut down (WWSD), minimum boiler temperature setting, and boiler differential setting. The control also has boiler sensor and outdoor sensor error checking.



ONE ZONE INSTALLATION W/O INDIRECT DHW



MULTI-ZONE INSTALLATION WITH ZONE CONTROL, WITH INDIRECT DHW

### CONTROL STRATEGY:

#### Outdoor Reset:

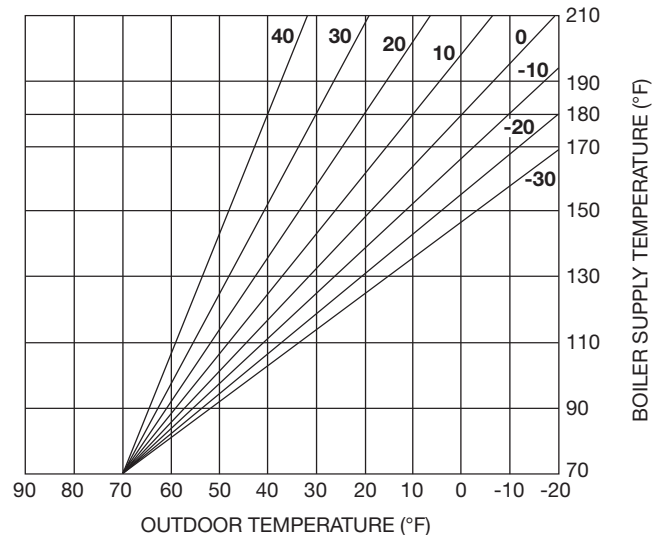
In order to properly control a hot water heating system, the heat supplied to the building must equal the heat lost by the building.

- The heat supplied to a building is proportional to the temperature of the supply water and the surface area of the heating element. A small surface area such as baseboard radiators requires a higher water temperature than a larger surface area such as radiant floors.
- The heat lost from a building is dependent on the outdoor temperature, as well as other factors. As the outdoor temperature drops, the building heat loss increases.

#### Reset Ratio:

Operation of a hot water heating system can generally be improved by modulating the supply water temperature as the outdoor temperature changes. Using this approach, the heat lost from the building is matched by the heat input to the building. The SR501-OR boiler reset control utilizes a reset ratio to set the relationship between outdoor temperature and supply water temperature. The reset ratio determines the amount the supply water temperature is raised for every 1° drop in outdoor air temperature, and it is determined from the starting point and the system design conditions. In order for the control to automatically determine the reset ratio, outdoor design conditions must be established. This is usually the typical coldest outdoor temperature or it can be set by using ASHARE standards for Design Outdoor Temperature for specific geographic locations.

BOILER SUPPLY TEMPERATURE vs. OUTDOOR TEMPERATURE (°F) FOR OUTDOOR DESIGN TEMPERATURES



# SR501-OR-4 Switching Relay Instruction Sheet (page 2)

## Boiler Operation:

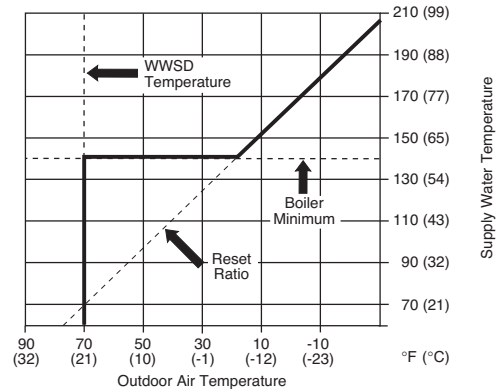
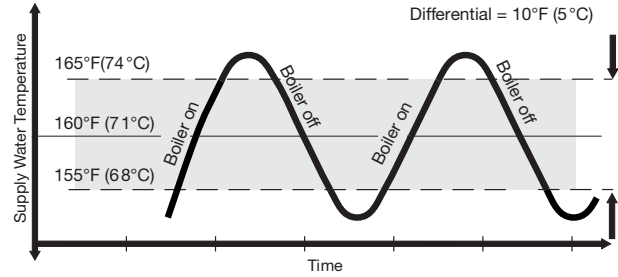
The supply water temperature from a boiler can be controlled by cycling the boiler on and off. Modulation of the boiler's operating temperature in hot water heating systems not only provides more comfort but also offers significant energy savings. The cooler the boiler runs, the more efficient it is due to less heat losses up the flue and reduced boiler jacket losses.

### Differential:

An on / off boiler must be operated with a differential in order to prevent short cycling. When the supply water temperature drops below the bottom rail of the differential, the boiler is turned on. The boiler is then kept on until the supply water temperature rises above the top rail of the differential. If the differential is too wide, there can be large supply water temperature swings; however, if the differential is too narrow, the boiler short cycles and operates inefficiently. This control can be set for two different boiler differentials, 10°F (6°C) or 20°F (12°C). This setting will help to achieve an appropriate balance between temperature swings and boiler efficiency.

### Minimum Boiler Supply:

Most boilers require a minimum supply water temperature in order to prevent corrosion from flue gas condensation. The control should therefore only modulate the boiler supply water temperature down to the boiler manufacturer's minimum recommended operating temperature. Some boilers are designed to condense and should be operated at low water temperatures as much as possible for maximum efficiency.



## SEQUENCE OF OPERATION:

### Powering Up the Control:

After the SR501-OR is powered up, the green power LED light will be on.

### Heating Demand:

The SR501-OR receives a heating demand from thermostat or zone control end switch closure on the R and W thermostat terminals. The thermostat red LED light will also be turned on. The control can be setup for boiler temperature reset or ON – OFF boiler operation.

### Reset Demand:

When the SR501-OR receives a heating demand the controls enable the boiler based on the reset curve. The Boiler Relay red LED light will be turned on when the boiler relay is energized.

### DHW Demand:

When the SR501-OR receives a DHW demand the controls enable the boiler and ignore the boiler reset curve. The DHW Override red LED light will also be turned on.

### Warm Weather Shut Down (WWSO):

When the outdoor temperature rises above 70°F (21°C), the control turns off the boiler. This function only applies for space heating and not DHW operation.

## INSTALLATION:

**CAUTION: Improper installation and operation of this control could result in damage to the equipment and possibly even personal injury. It is your responsibility to ensure that this control is safely installed according to all applicable codes and standards. This electronic control is not intended for use as a primary limit control. Other controls that are intended and certified as safety limits must be part of the control circuit.**

### Step One:

Check the contents of this package. If any of the contents listed are missing or damaged, please contact your sales representative for assistance.

## Boiler Operation:

When the SR501-OR has a reset demand, the system supply water temperature is controlled by turning the boiler on and off. The control calculates the target supply water temperature based on the outdoor temperature, and the settings that were entered. The boiler operates around a differential that is manually set by dip switch number 2. The control includes a minimum on and off time for the boiler, in order to minimize short cycling.

### Maximum Boiler Supply:

The SR501-OR does not allow the boiler target temperature to exceed the boiler design temperature setting plus 10°F (6°C) up to a maximum of 225°F (107°C).

### Minimum Boiler Supply:

The SR501-OR has a 140°F minimum boiler setting which is used in order to prevent corrosion from flue gas condensation. During mild outdoor conditions, the boiler cycles around the minimum boiler setting. This programmed function can be set to the OFF setting for condensing and electric boilers.

The SR501-OR includes:

- SR501-OR Boiler Reset Control and Switching Relay Combination
- One Outdoor Sensor
- One Strap on Sensor
- Instruction Sheet

Replacement sensors are available from Taco, Inc.:

- Strap on Sensor – 9300-2044RP
- Outdoor Sensor – 9300-2052RP

**Note:** Carefully read the details of the Sequence of Operation section in this brochure to ensure that you have chosen the proper control for your application.

# SR501-OR-4 Switching Relay Instruction Sheet (page 3)

## Step Two:

Installing the Control:

The enclosure is to be mounted flush onto a wall or any ridge surface.

- The mounting holes in the enclosure accept #6 screws.
- Line voltage to enter from bottom of control and low voltage to enter from top of control.

Installing the Outdoor Sensor:

**Note:** The temperature sensor (thermistor) is built into the enclosure.

- Use one round or pan head screw to attach the base of the sensor to the wall.
- The sensor is wall mounted and the wiring enters through the bottom of the enclosure. The hole for the cable entry must face downward in order to prevent water from entering and filling the enclosure.
- The sensor should be mounted on a wall which best represents the heat load on the building (i.e. a northern wall for buildings and a southern facing wall for buildings with large south facing glass areas). The sensor should not be installed near heat sources such as ventilation or window openings.
- The sensor should be installed at an elevation above the ground that will prevent accidental damage or tampering.
- Install the Outdoor Sensor and run the wiring back to the control mounting location.

Installing the Boiler Sensor:

**Note:** This sensor is designed to mount on a pipe or in a temperature immersion well.

- The sensor can be strapped directly to the pipe using the cable tie provided. Insulation should be placed around the sensor to reduce the effect of air currents on the sensor measurement.
- The Boiler Sensor should be placed downstream of a pump or after an elbow or similar fitting. This is especially important if large diameter pipes are used because the thermal stratification within the pipe can result in erroneous sensor readings. Proper sensor location requires that the fluid is thoroughly mixed within the pipe before it reaches the sensor.

## Step Three:

Wiring to the Zone Control:

Line Voltage Connections –

Connect 120VAC incoming line voltage; Hot to the H terminal and Neutral to the N terminal.

Connect 120VAC circulator; HOT lead of circulator to Zone H terminal and Neutral lead of circulator to Zone N terminal.

Low Voltage Connections –

Connect thermostat or zone control end switch to the R and W thermostat terminals.

Connect the DHW aquastat to the R and W DHW override terminals (optional).

Connect boiler's T and T terminal to the X and X boiler end switch terminals.

Wiring the Sensors:

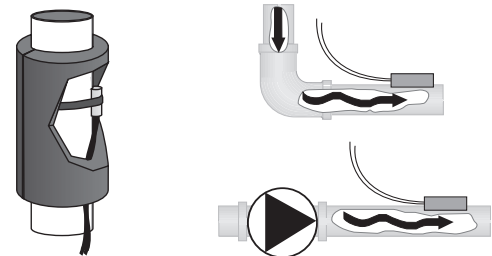
**Do not apply power to these terminals as this will damage the control.**

Outdoor Sensor

Connect the two wires from the Outdoor Sensor to the Outdoor Sensor terminals. The Outdoor Sensor measures the outdoor air temperature.

Boiler Sensor

Connect the two wires from the Boiler Sensor to the Supply Sensor terminals. The Boiler Sensor measures the supply water temperature going from the boiler to the system.



## SETTINGS:

Before adjusting the settings, read through the sequence of operation to ensure that you understand how the control operates. The following page describes how to program these settings into the control once it has been powered up.

### Step Four:

Outdoor Design Temperature:

The Outdoor Design setting is the outdoor temperature used in the heat loss calculation. It is set to the typical coldest outdoor temperature. Using a small screwdriver adjust the reset ratio knob to appropriate Outdoor Design Temperature. When set to OFF, the boiler temperature will not be reset and boiler will fire to high limit when there is a call for heat.

Boiler Minimum Supply Temperature (Dip Switch #1):

Most boilers require a minimum operating temperature to prevent corrosion from flue gas condensation. The minimum boiler dip switch should be set to ON (140°F) supply water temperature so boiler can operate without causing the boiler flue gases to condense. Consult the boiler manufacturer for recommended minimum boiler supply temperatures. The dip switch can also be set to OFF (70°F) when condensation is not a concern.

Differential (Dip Switch #2):

The differential adjustment sets how far the actual boiler supply water temperature may deviate from the desired temperature before the boiler is turned on or off. This is a function of the water content of the boiler and the flow rate through the system pump relative to the heat output of the boiler. The differential can be set by dip switch #2, set to OFF for 10°F (6°C) or set to ON for 20°F (12°C).

Pump Operation (Dip Switch #3):

The pump operation is controlled by dip switch #3. When the dip switch is set to ON, the pump output will energize when thermostat or DHW calls for heat. When set to OFF, the pump will only come on when the thermostat calls for heat not the DHW.

Warm Weather Shut Down:

When the outdoor temperature rises above the 70°F (21°C), the control turns off the boiler. This function only applies for space heating and not DHW operation.

# SR501-OR-4 Switching Relay Instruction Sheet (page 4)

## TROUBLESHOOTING:

### Step Five:

As in any troubleshooting procedure, it is important to isolate a problem as much as possible before proceeding. The blinking error LED light greatly simplifies troubleshooting of the SR501-OR. If you suspect a wiring fault, return to step three and carefully check all external wiring and wiring connections.

### Sensor Errors:

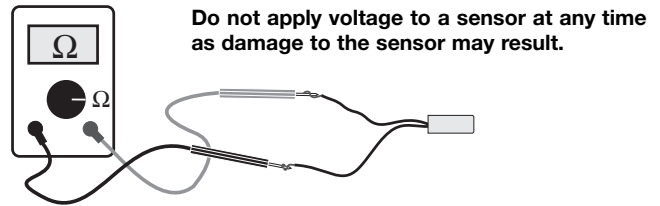
- If an outdoor sensor fault occurs, the SR501-OR will assume a fixed outdoor temperature of 32°F (0°C) and will target the appropriate supply water temperature. The Boiler light will blink twice every 5 seconds to indicate the outdoor sensor error.
- If a boiler sensor fault occurs, the SR501-OR turns the boiler off and the Boiler light will blink once every 5 seconds to indicate the boiler supply sensor error.

### Adjustment of Settings:

- If the outdoor temperature is cold and the rooms are cold, increase the Outdoor Design setting by 5°F (3°C) per day.
- If the boiler is cycling too often, increase the Differential setting.

### Testing the Sensors:

A good quality test meter capable of measuring up to 5,000 kΩ (1 k = 1000 Ω) is required to measure the sensor resistance. In addition to this, the actual temperature must be measured with either a good quality digital thermometer, or, if a thermometer is not available, a second sensor can be placed alongside the one to be tested and the readings compared. First measure the temperature using the thermometer and then measure the resistance of the sensor at the control. The wires from the sensor must not be connected to the control while the test is performed. Using the chart below, estimate the temperature measured by the sensor. The sensor and thermometer readings should be close. If the test meter reads a very high resistance, there may be a broken wire, a poor wiring connection or a defective sensor. If the resistance is very low, the wiring may be shorted, there may be moisture in the sensor or the sensor may be defective. To test for a defective sensor, measure the resistance directly at the sensor location.



Temperature		Resistance	Temperature		Resistance	Temperature		Resistance	Temperature		Resistance
°F	°C	Ω	°F	°C	Ω	°F	°C	Ω	°F	°C	Ω
-30	-34	234,196	30	-1	34,558	90	32	7,334	150	66	2,045
-20	-29	165,180	40	4	26,099	100	38	5,828	160	71	1,689
-10	-23	118,018	50	10	19,900	110	43	4,665	170	77	1,403
0	-18	85,362	60	16	15,311	120	49	3,760	180	82	1,172
10	-12	62,465	70	21	11,883	130	54	3,050	190	88	983
20	-7	46,218	80	27	9,299	140	60	2,490	200	93	829

## TECHNICAL DATA:

The installer must ensure that this control and its wiring are isolated and/or shielded from strong sources of electromagnetic noise. This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

### SR501-OR Boiler Reset Control Relay:

Control: Microprocessor PI control. **This is not a safety (limit) control.**

Dimensions: 4<sup>1</sup>/<sub>4</sub>" W x 5<sup>1</sup>/<sub>4</sub>" H x 2<sup>3</sup>/<sub>4</sub>" D

Approvals: UL listed for US and Canada, Temperature Indicating and Regulating Equipment.

Power Supply: 120/60/1 VAC, 12 amps maximum

Relays: Boiler Relay 1 amp @ 24 VAC  
Circulator Relay 1/3 HP (6 FLA, 36 LRA)

Sensors: NTC thermistor, 10 kΩ @ 77°F (25°C ±0.2°C) β=3892

Outdoor Design Temp.: -30°F to 40°F (-35°C to 5°C)

Boiler Minimum: 70°F or 140°F (21°C or 60°C)

Differential: 10°F or 20°F (6°C or 12°C)

WWSD: 70°F (21°C)

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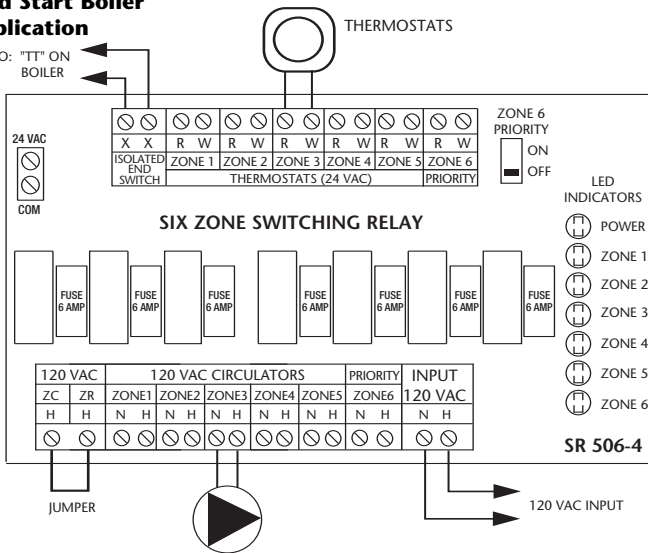


# Instruction Sheet

## SR502/503/504/506-4 Switching Relay

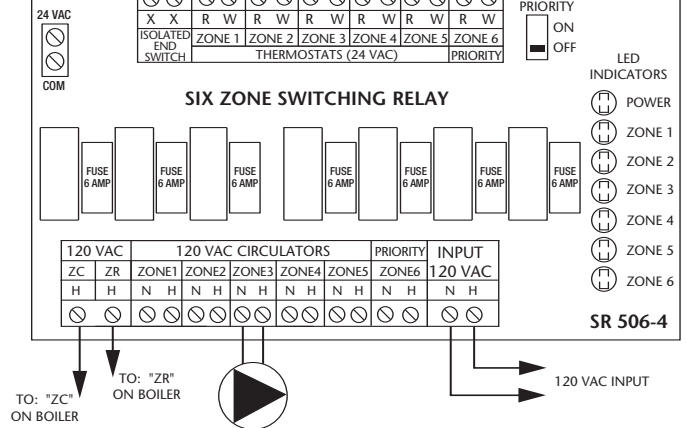
### Cold Start Boiler Application

TO: "TT" ON BOILER



### Tankless Coil Boiler Application (Alternative Wiring)

TO: "ZC" ON BOILER



**Operation:** When any thermostat calls for heat, the appropriate circulator is energized and the isolated end switch (X and X) will start the boiler.

**Priority Operation:** When zone 6 is switched to the priority setting and is actuated, all other zones will stop operation until zone 6 is satisfied. When zone 6 is not switched to priority, all zones will operate independently.

**Priority Protection Operation:** When the priority switch is set to ON, and if the priority zone calls continuously for more than one hour, power is returned to all the other zones, allowing each zone to function independently. Once the priority zone is satisfied, the control's auto-reset is activated and the priority zone is again allowed to have priority for up to one hour starting from when it calls next.

**Jumper Placement:** The jumper should be placed between terminals ZC and ZR. Connect the isolated end switch to the aquastat control on the boiler.

**Power Input:** Connect 120 volt ac power input to terminals N and H. Neutral wire to terminal N. Hot wire to terminal H.

**Operation:** When any thermostat calls for heat, the boiler is given a signal to start. The appropriate circulator is energized only when the boiler temperature is above the set low limit.

**Priority Operation:** When zone 6 is switched to the priority setting and is actuated, all other zones will stop operation until zone 6 is satisfied. When zone 6 is not switched to priority, all zones will operate independently.

**Priority Protection Operation:** When the priority switch is set to ON, and if the priority zone calls continuously for more than one hour, power is returned to all the other zones, allowing each zone to function independently. Once the priority zone is satisfied, the control's auto-reset is activated and the priority zone is again allowed to have priority for up to one hour starting from when it calls next.

**Jumper Placement:** **REMOVE** the jumper between terminals ZC and ZR. Connect terminal ZC to ZC on the aquastat control. Connect terminal ZR to ZR on the aquastat control. Confirm polarity is consistent between boiler aquastat and switching relay.

**Power Input:** Connect 120 volt ac power input to terminals N and H. Neutral wire to terminal N. Hot wire to terminal H.

**WARNING:** When using Alternative Wiring diagram, wiring instructions must be followed so power originates from the boiler aquastat. Failure to follow these wiring instructions may result in a secondary source of power being connected to the boiler that may activate it under certain circumstances, causing injury or death.

### The Taco Connection:

Combine the reliability of the Taco Zone Valves, Priority Zoning Circulators, Thermostats, and the "00" family of circulators with the advanced features of the Taco Zone Controls to achieve total system integration. No matter the application, Taco now provides the products to maximize system performance while simplifying both installation and service.

### External Diagnostics:

Externally visible lights show full functionality of the switching relay. The green light should always be on, indicating that power is connected. When the thermostat calls for heat, both the appropriate circulator and red indicating light is energized.

### Specifications:

PRODUCT NUMBER	NUMBER OF ZONES	INPUT VOLTAGE	MAXIMUM COMBINED LOAD	TYPE 1 ENCLOSURE		
				WIDTH	HEIGHT	DEPTH
SR506-4	6 with Priority	120/60/1 VAC	20 amps	12 1/4"	8"	3"

All circulator relay connections, including ZC/ZR, are rated 1/3 hp (6 FLA, 36 LRA) at 120 VAC. End switch connections are rated 24 VAC, 1 amp. All thermostat connections supply a 24 VAC class 2 output.

### Features:

External Indicator Lights  
Switchable Priority  
Priority Protection  
Simplified Wiring  
Sealed Relays  
Fuse Protected Outputs  
Compact Design  
100% Factory Tested  
Isolated End Switch

Contractor Friendly PC Board Layout  
Universal Thermostat Compatibility  
UL Approved  
24 volt Power Input or Output Terminal  
Extended 3 Year Warranty  
Made in the USA

**WARNING:** Wiring connections must be made in accordance with all applicable electrical codes. Use copper wire only. 120 VAC wiring must have a minimum temperature rating of 75°C. Failure to follow this instruction can result in personal injury or death and/or property damage. 12-18 gauge wire recommended for 120 VAC connections, 14-22 gauge wire for thermostat connections, and 14-22 gauge wire for 24 VAC source connections.

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

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# Instruction Sheet

## SR501-EXP-4 Switching Relay

**Operation:** When the thermostat calls for heat, the circulating pump is energized and the isolated end switch (X and X) will start the boiler.

**Priority Operation:** When the priority dip switch is set to ON and the zone is actuated, all other connected zoning panels will stop operation until the zone is satisfied. When the priority dip switch is set to OFF and the zone is actuated, all other connected zoning panels will operate independently.

**Mode Operation:** When the mode dip switch is set to NORMAL, the end switch relay will be energized if any zone is in operation. When the mode dip switch is set to RESET, the end switch relay will only be energized through the operation of a plug-in reset control or closure of Priority Input.

**Primary Pump Operation:** When the dip switch is set to OFF, the primary circulating pump output will not energize when zone calls for heat. When the dip switch is set to ON, the primary circulating pump output will energize when zone calls for heat.

**Post Purge Operation:** When the dip switch is set to ON, the circulation pump output will stay energized for 2 minutes after its thermostat or aquastat is satisfied, but not operate the boiler.

**Priority Protection Operation:** When the dip switch is set to ON and the zone (priority) on master zone panel calls for heat continuously for more than one hour, then power is returned to the space heating zones allowing all the zones to function independently. Once the zone (priority) on master zone panel is satisfied, the control's auto-reset is activated and the zone is again allowed to have priority for up to one hour.

**Pump Exercise Operation:** When the dip switch is set to ON, the solid state timer cycles all the circulating pumps that are attached to the Expandable Switching Relay at the selected time interval. The time interval can be set for the pumps to run for either 30 seconds every 2 weeks or for 4 minutes every 24 hours.

**End Switch:** The switch closes when the thermostat calls for heat and the mode switch is set to NORMAL. The end switch also closes when the mode switch is set to RESET and a PC Series boiler reset power control is calling for heat.

**Expansion Connections:** Set the expansion switch to MASTER on the switching relay that has the designated priority zone or is utilizing the PC Series plug-in option. Set all other daisy chained controls to SLAVE. Using thermostat wire (18-22 gauge) connect between terminals A, B, C on the master control to the corresponding A, B, C on the SLAVE control(s). Controls may be daisy chained up to 20 zoning panels using any combination of -EXP controls (120 zones if all are 6 zone panels).

### Thermostat Input (24 vac):

- R** Hot side of transformer. Connect to **R** on thermostat.
- W** Switched **R** signal from thermostat. Connect to **W** on thermostat.
- C** Common side of transformer. Connect to **COM** on thermostat (optional).

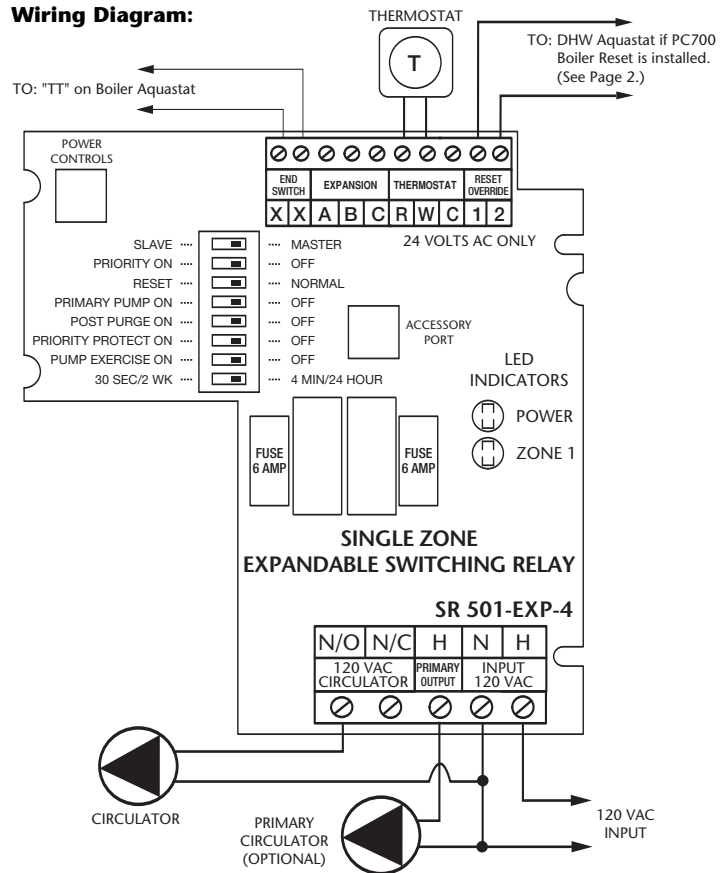
### 120 VAC Connections (N is Neutral, H is Hot):

- Power Input** Connect 120 Volt AC power.
- Primary** Primary Pump (optional)
- N/O Zone** Circulator Zone
- N/C Zone** Normally closed terminal for the Circulator Zone. Will deactivate on a thermostat call.
- N** Connect to pump neutral leads.

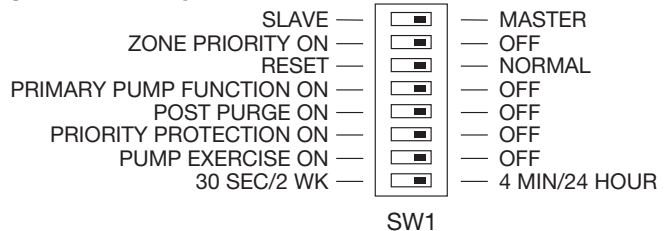
### Features:

- Front External Indicator Lights
- Ideal for Retrofitting
- Primary Circulator Output
- Simplified Wiring
- Add-On Power Controls
- Sealed Relays
- Compact Design
- Fuse Protected
- 100% Factory Tested
- Isolated End Switch
- UL Approved
- Expandable to 20 Zoning Panels (120 zones if all are 6 zone panels)
- Contractor Friendly PC Board Layout
- Universal Thermostat Compatibility
- 24 volt Power Input or Output Terminal
- Extended 3 Year Warranty
- Made in the USA

### Wiring Diagram:



### Dip Switch Settings:



For more wiring diagrams, visit [www.taco-hvac.com](http://www.taco-hvac.com).

**External Diagnostics:** Externally visible lights show full functionality of the switching relay. The green light should always be on, indicating that power is connected. When the thermostat calls for heat, both the appropriate circulator and red indicating light are energized.

### Specifications:

PRODUCT NUMBER	NUMBER OF ZONES	INPUT VOLTAGE	MAXIMUM COMBINED LOAD	WIDTH	HEIGHT	DEPTH
SR501-EXP-4	1	120/60/1 VAC	12 amps	4 7/8"	6 7/8"	2 3/8"

All circulator relay connections, including ZC/ZR, are rated 1/3 hp (6 FLA, 36 LRA) at 120 VAC. The end switch connection is rated 24 VAC, 1 amp. The thermostat connection supplies a 24 VAC class 2 output.

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

**WARNING:** Wiring connections must be made in accordance with all applicable electrical codes. Use copper wire only. 120 VAC wiring must have a minimum temperature rating of 75°C. Failure to follow this instruction can result in personal injury or death and/or property damage. 12-18 gauge wire recommended for 120 VAC connections, 14-22 gauge wire for thermostat connections, and 14-22 gauge wire for 24 VAC source connections.

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# Instruction Sheet

## SR503-EXP, SR504-EXP & SR506-EXP Switching Relay

**Operation:** When any thermostat calls for heat, the appropriate circulating pump is energized and the isolated end switch (X and X) will start the boiler.

**Priority Operation:** When the priority dip switch is set to ON and the priority zone is actuated, all other zones will stop operation until priority zone is satisfied. When not switched to priority, all zones will operate independently.

**Mode Operation:** When the dip switch is set to NORMAL, the end switch relay will be energized if any zone is in operation. When the switch is set to RESET, the end switch relay will only be energized if the priority zone is in operation, or through the operation of a plug-in reset control.

**Primary Pump Operation:** When the dip switch is set to OFF, the primary circulating pump output will energize when any zone calls for heat, except the priority zone. When the dip switch is set to ON, the primary circulating pump output will energize when any zone calls for heat.

**Post Purge Operation:** When the dip switch is set to ON, the priority zone output will stay energized for 2 minutes after its thermostat or aquastat is satisfied, but not operate the boiler.

**Priority Protection Operation:** When the dip switch is set to ON, and if the priority zone calls continuously for more than one hour, power is returned to all the other zones, allowing each zone to function independently. Once the priority zone is satisfied, the control's auto-reset is activated and the priority zone is again allowed to have priority for up to one hour starting from when it calls next.

**Pump Exercise Operation:** When the dip switch is set to ON, the solid state timer cycles all the circulating pumps that are attached to the Expandable Switching Relay at the selected time interval. The time interval can be set for the pumps to run for either 30 seconds every 2 weeks or for 4 minutes every 24 hours.

**Low Limit (ZC) Operation:** When the dip switch is set to ON and the boiler drops below the set low limit (terminal ZC connected to boiler), all zone circulating pumps will stop. When the boiler rises above the set low limit, the zone circulating pumps are allowed to operate.

**End Switches (Dry Contacts):** The main end switch closes when any zone thermostat calls for heat and the mode switch is set to NORMAL. The main end switch also closes when the mode switch is set to RESET and a PC Series boiler reset power control is calling for heat. The priority end switch closes only when the priority zone thermostat or aquastat is calling for heat.

**Expansion Connections:** Set the expansion switch to MASTER on the switching relay that has the designated priority zone or is utilizing the PC Series plug-in option. Set all other daisy chained controls to SLAVE. Using thermostat wire (18-22 gauge) connect between terminals A, B, C on the master control to the corresponding A, B, C on the SLAVE control(s). Controls may be daisy chained up to 20 zoning panels using any combination of -EXP controls (120 zones if all are 6 zone panels).

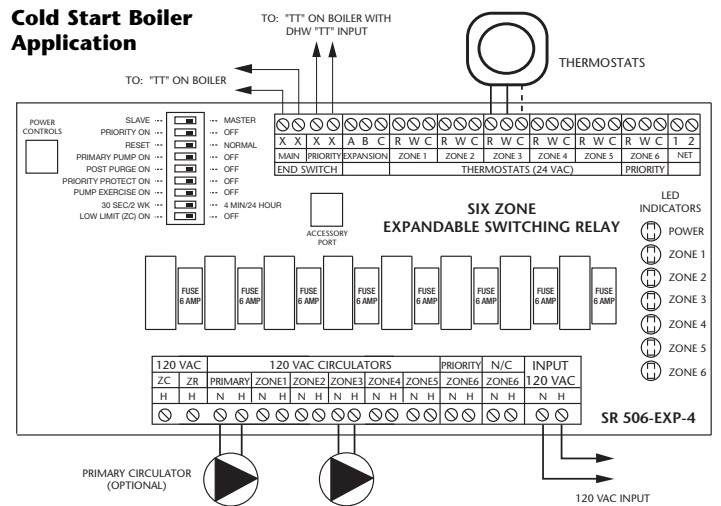
### Thermostat Input (24 vac):

- R** Hot side of transformer. Connect to **R** on thermostat.
- W** Switched **R** signal from thermostat. Connect to **W** on thermostat.
- C** Common side of transformer. Connect to **COM** on thermostat (optional).
- NET** Network terminals 1 & 2 are tied together for wiring convenience when using communicating style thermostats (optional).

### 120 VAC Connections (N is Neutral, H is Hot):

- Power Input** Connect 120 Volt AC power
- Primary** Primary Pump (optional)
- Zone 1-5** Circulator Zones
- Priority Zone 6** Priority Zone (if enabled) or Zone 6
- N/C Zone 6** Normally closed terminals for the Priority Zone. Will deactivate on a Priority Zone call.

### Cold Start Boiler Application



### Dip Switch Settings:

- SLAVE —  — MASTER
- ZONE PRIORITY ON —  — OFF
- RESET —  — NORMAL
- PRIMARY PUMP FUNCTION ON —  — OFF
- POST PURGE ON —  — OFF
- PRIORITY PROTECTION ON —  — OFF
- PUMP EXERCISE ON —  — OFF
- 30 SEC/2 WK —  — 4 MIN/24 HOUR
- LOW LIMIT (ZC) ON —  — OFF

**External Diagnostics:** Externally visible lights show full functionality of the switching relay. The green light should always be on, indicating that power is connected. When the thermostat calls for heat, both the appropriate circulator and red indicating light are energized.

For more wiring diagrams, visit [www.taco-hvac.com](http://www.taco-hvac.com).

### Specifications:

PRODUCT NUMBER	NUMBER OF ZONES	INPUT VOLTAGE	MAXIMUM COMBINED LOAD	TYPE 1 ENCLOSURE WIDTH	HEIGHT	DEPTH
SR506-EXP-4	6 with Priority	120/60/1 VAC	20 amps	12 1/4"	8"	3"

All circulator relay connections, including ZC/ZR, are rated 1/3 hp (6 FLA, 36 LRA) at 120 VAC. End switch connections are rated 24 VAC, 1 amp. All thermostat connections supply a 24 VAC class 2 output.

### Features:

- Front External Indicator Lights
- Ideal for Retrofitting
- Primary Circulator Output
- Simplified Wiring
- Plug-In Power Controls
- Sealed Relays
- Compact Design
- Fuse Protected
- 100% Factory Tested
- Two Isolated End Switches
- Expandable to 20 Zoning Panels (120 zones if all are 6 zone panels)
- Contractor Friendly PC Board Layout
- Universal Thermostat Compatibility
- UL Approved
- 24 volt Power Input or Output Terminal
- Extended 3 Year Warranty
- Made in the USA

**WARNING:** Wiring connections must be made in accordance with all applicable electrical codes. Use copper wire only. 120 VAC wiring must have a minimum temperature rating of 75°C. Failure to follow this instruction can result in personal injury or death and/or property damage. 12-18 gauge wire recommended for 120 VAC connections, 14-22 gauge wire for thermostat connections, and 14-22 gauge wire for 24 VAC source connections.

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

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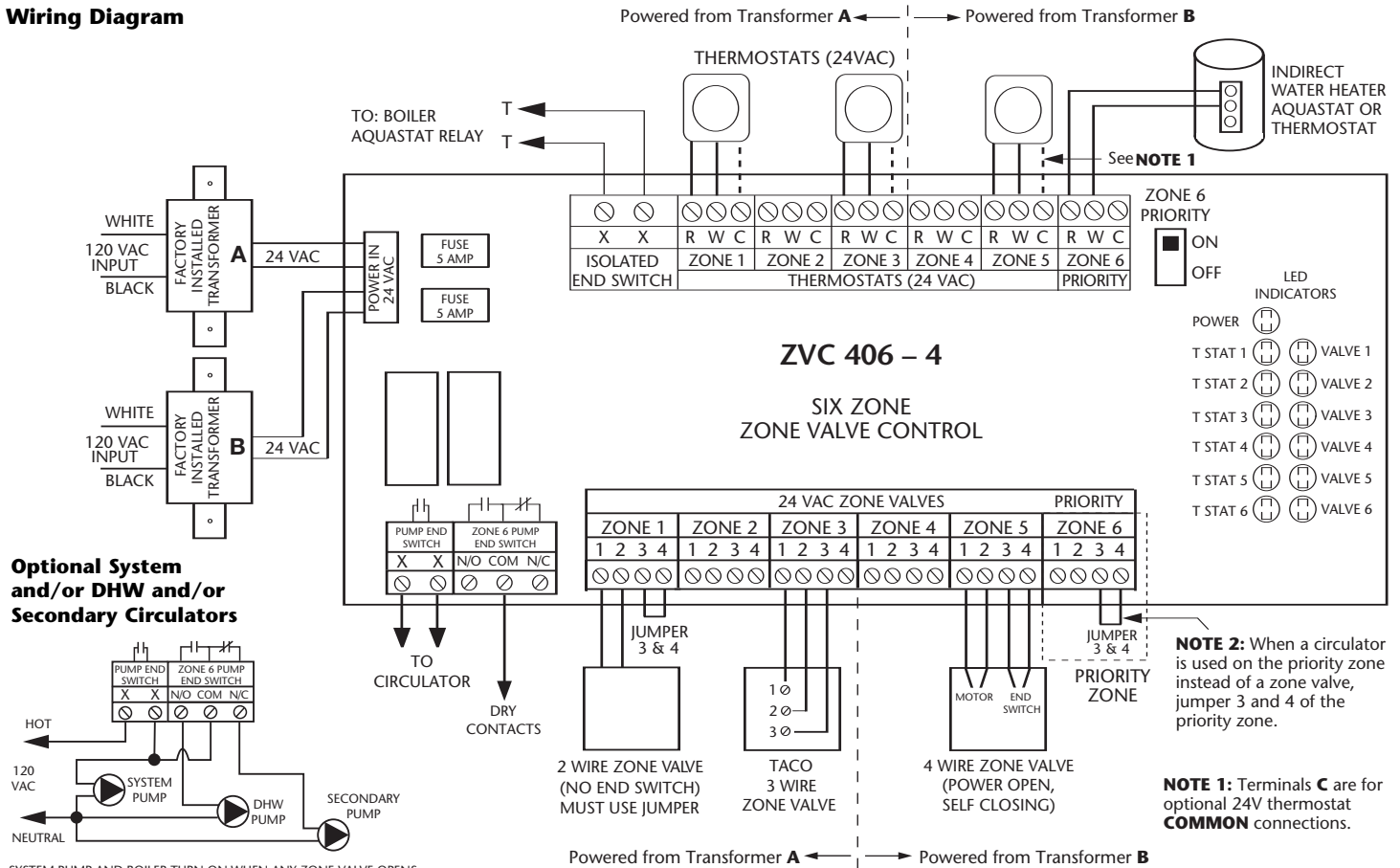
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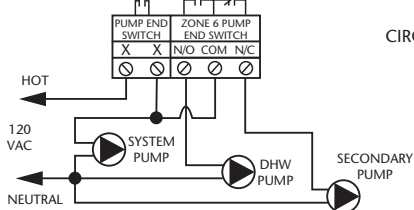
# Instruction Sheet

## ZVC403/404/405/406-4 Zone Valve Control

### Wiring Diagram



### Optional System and/or DHW and/or Secondary Circulators



SYSTEM PUMP AND BOILER TURN ON WHEN ANY ZONE VALVE OPENS.  
DHW PUMP TURNS ON ONLY WHEN PRIORITY ZONE CALLS.  
SECONDARY PUMP COMES ON WHEN ANY ZONE CALLS EXCEPT PRIORITY ZONE.

**Operation/External Diagnostics:** When any thermostat calls for heat, the appropriate zone valve is energized and the yellow light goes on. When the zone valve is fully open, the red light goes on and energizes the end switch relay. The green light should always be on, indicating that power is connected.

**Priority Operation:** When zone 6 is switched to the priority setting and is actuated, all other zones will stop operation until zone 6 is satisfied. When zone 6 is not switched to priority, all zones will operate independently. **Note:** When a circulator is used on the priority zone instead of a zone valve, jumper 3 and 4 of the priority zone.

**Priority Protection Operation:** When the priority zone calls continuously for more than one hour, power is returned to all the other zones, allowing each zone to function independently. Once the priority zone is satisfied, the control's auto-reset is activated and the priority zone is again allowed to have priority for up to one hour starting from when it calls next.

**The Taco Connection:** Combine the reliability of the Taco Zone Valves, Priority Zoning Circulators, Thermostats, and the "00" family

of circulators with the advanced features of the Taco Zone Controls to achieve total system integration. No matter the application, Taco now provides the products to maximize system performance while simplifying both installation and service.

### Features:

- External Indicator Lights
- Switchable Priority
- Priority Protection
- Simplified Wiring
- Works with 2, 3, or 4-Wire Zone Valves
- Compact Design
- Fuse Protected
- 100% Factory Tested
- Isolated End Switch
- Extra Set of Dry Contacts
- Contractor Friendly PC Board Layout
- Universal Thermostat Compatibility
- UL Approved
- Sturdy Screw Connections
- Extended 3 Year Warranty
- Made in the USA

**WARNING:** Wiring connections must be made in accordance with all applicable electrical codes. Use copper wire only. 120 VAC wiring must have a minimum temperature rating of 75°C. Failure to follow this instruction can result in personal injury or death and/or property damage. 12-18 gauge wire recommended for 120 VAC connections, 14-22 gauge wire for thermostat connections, and 14-22 gauge wire for 24 VAC source connections.

### Specifications:

PRODUCT NUMBER	NUMBER OF ZONES	INPUT VOLTAGE	MAX 24 VAC OUTPUT @ 25°C	TYPE 1 ENCLOSURE WIDTH	HEIGHT	DEPTH
ZVC406-4	6 with Priority	120/60/1 VAC, 3A	24 VA per Zone 40 VA per Transformer	12 1/4"	8"	3"

The pump end switches are rated 1/2 hp, 5 amps at 120 VAC. The main and priority end switch connections are rated 24 VAC, 1 amp. All thermostat and zone valve connections supply a 24 VAC class 2 output.

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

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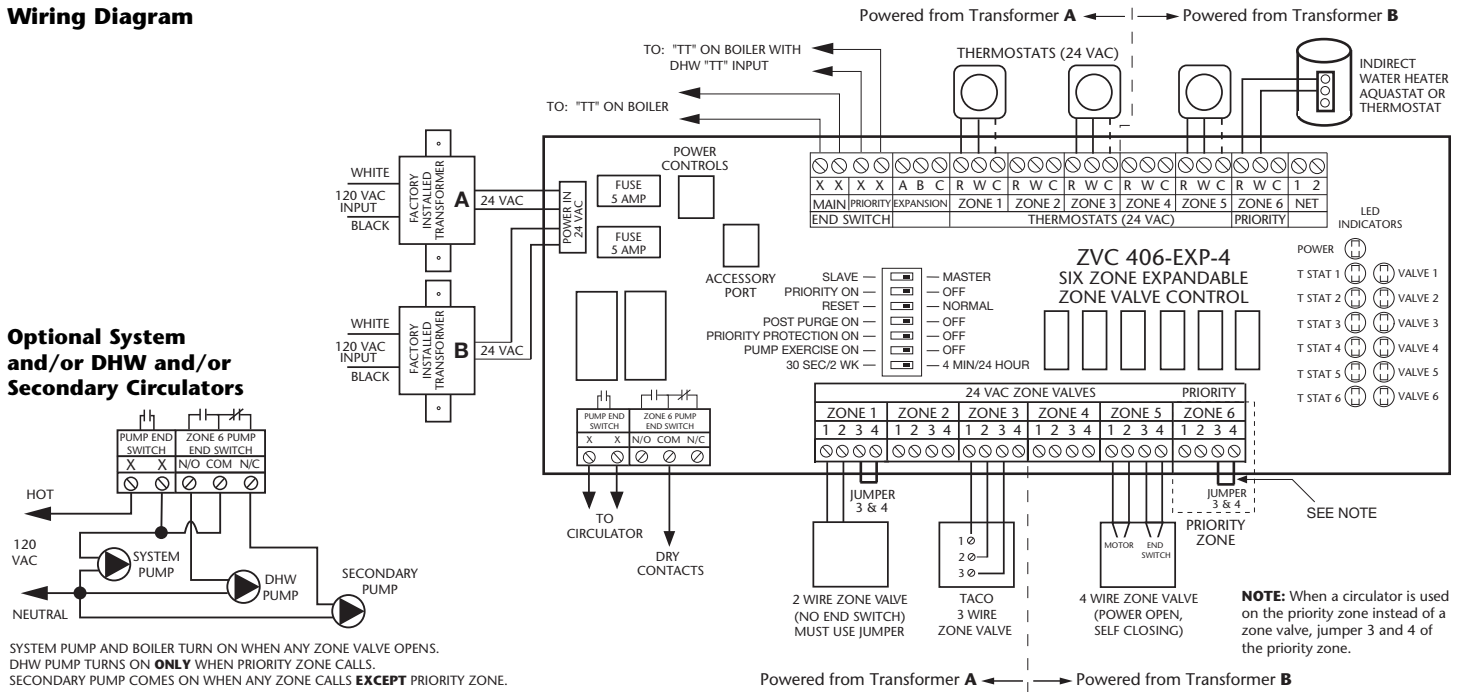




# Instruction Sheet

## ZVC404-EXP & ZVC406-EXP Zone Valve Control

### Wiring Diagram



SYSTEM PUMP AND BOILER TURN ON WHEN ANY ZONE VALVE OPENS.  
 DHW PUMP TURNS ON **ONLY** WHEN PRIORITY ZONE CALLS.  
 SECONDARY PUMP COMES ON WHEN ANY ZONE CALLS **EXCEPT** PRIORITY ZONE.

**Operation/External Diagnostics:** When any thermostat calls for heat, the appropriate zone valve is energized and the yellow light goes on. When the zone valve is fully open, the red light goes on and energizes the end switch relay. The green light should always be on, indicating that power is connected.

**Priority Operation:** When the priority dip switch is set to ON and the priority zone is actuated, all other zones will stop operation until priority zone is satisfied. When not switched to priority, all zones will operate independently.

**Mode Operation:** When the dip switch is set to NORMAL, the end switch relay will be energized if any zone is in operation. When the switch is set to RESET, the end switch relay will only be energized if the priority zone is in operation, or through the operation of a plug-in reset control.

**Post Purge Operation:** When the dip switch is set to ON, the priority zone output will stay energized for 2 minutes after its thermostat or aquastat is satisfied, but not operate the boiler.

**Priority Protection Operation:** When the dip switch is set to ON, and if the priority zone calls continuously for more than one hour, power is returned to all the other zones, allowing each zone to function independently. Once the priority zone is satisfied, the control's auto-reset is activated and the priority zone is again allowed to have priority for up to one hour starting from when it calls next.

**Pump Exercise Operation:** When the dip switch is set to ON, the solid state timer cycles all the zone valves and circulating pumps that are attached to the Expandable Zone Valve Control at the selected time interval. The time interval can be set for the valves and pumps to run for either 30 seconds every 2 weeks or for 4 minutes every 24 hours.

**End Switches (Dry Contacts):** The main end switch closes when any zone thermostat calls for heat and the mode switch is set to NORMAL. The main end switch also closes when the mode switch is set to RESET and a PC Series boiler reset power control is calling for heat. The priority

end switch closes only when the priority zone thermostat or aquastat is calling for heat.

**Expansion Connections:** Set the expansion switch to MASTER on the switching relay that has the designated priority zone or is utilizing the PC Series plug-in option. Set all other daisy chained controls to SLAVE. Using thermostat wire (18-22 gauge) connect between terminals A, B, C on the master control to the corresponding A, B, C on the SLAVE control(s). Controls may be daisy chained up to 20 zoning panels using any combination of -EXP controls (120 zones if all are 6 zone panels).

**Thermostat Input (24 vac):**  
**R** Hot side of transformer. Connect to **R** on thermostat.  
**W** Switched **R** signal from thermostat. Connect to **W** on thermostat.  
**C** Common side of transformer. Connect to **COM** on thermostat (optional).  
**NET** Network terminals 1 & 2 are tied together for wiring convenience when using communicating style thermostats (optional).

**Power Input (120 vac):**  
 Connect neutral (white) leads on transformers to 120 volts ac neutral power supply.  
 Connect hot (black) leads on transformers to 120 volts ac hot power supply.

**Pump End Switch (Dry Contacts):**  
 Connect hot power supply to the right side of the pump end switch terminal on board.  
 Connect hot input lead of the circulator to the left side of the pump end switch terminal on board.

**Zone 6 Pump End Switches (Dry Contacts):** See Diagram.  
**N/O** Normally open terminal of the priority zone relay.  
**COM** Common terminal of the priority zone relay.  
**N/C** Normally closed terminal of the priority zone relay.

**End Switch Pump Neutral Connections:**  
 Connect neutral power supply directly to neutral lead on circulator(s).

Specifications:						
PRODUCT NUMBER	NUMBER OF ZONES	INPUT VOLTAGE	MAX 24 VAC OUTPUT @ 25°C	TYPE 1 ENCLOSURE WIDTH	TYPE 1 ENCLOSURE HEIGHT	TYPE 1 ENCLOSURE DEPTH
ZVC406-EXP-4	6 with Priority	120/60/1 VAC, 3A	24 VA per Zone 40 VA per Transformer	12 1/4"	8"	3"

The pump end switches are rated 1/2 hp, 5 amps at 120 VAC. The main and priority end switch connections are rated 24 VAC, 1 amp. All thermostat and zone valve connections supply a 24 VAC class 2 output.

**WARNING:** Wiring connections must be made in accordance with all applicable electrical codes. Use copper wire only. 120 VAC wiring must have a minimum temperature rating of 75°C. Failure to follow this instruction can result in personal injury or death and/or property damage. 12-18 gauge wire recommended for 120 VAC connections, 14-22 gauge wire for thermostat connections, and 14-22 gauge wire for 24 VAC source connections.

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

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# Instruction Sheet

## Hydro Air Fan Controls

### Operation HAFC101 and 201:

The Hydro Air Fan Control is an interface between the thermostat and air handler. It also has an isolated end switch to start the boiler and/or pump. When the thermostat calls for heat, the Fan Control energizes the end switch relay and allows the fan to operate at low speed when the water is above the optional aquastat setting. When the thermostat calls for cooling, the Fan Control energizes the condenser and operates on high speed.

### Additional HAFC201 Operations:

Selectable one, three or four minute delay on fan operation in heating mode. Selectable pump exercise activates circulator but does not enable boiler contacts. Two minutes every 24 hours minimizes the chance of bacteria build-up in an open loop system. Thirty seconds every two weeks minimizes seasonal start-up problems generally associated with harsh water conditions. Optional aquastat or thermostat can be connected to Freeze Protection TT terminals to reduce the chance of pipes freezing by energizing the pump dry contacts (boiler contacts not activated.)

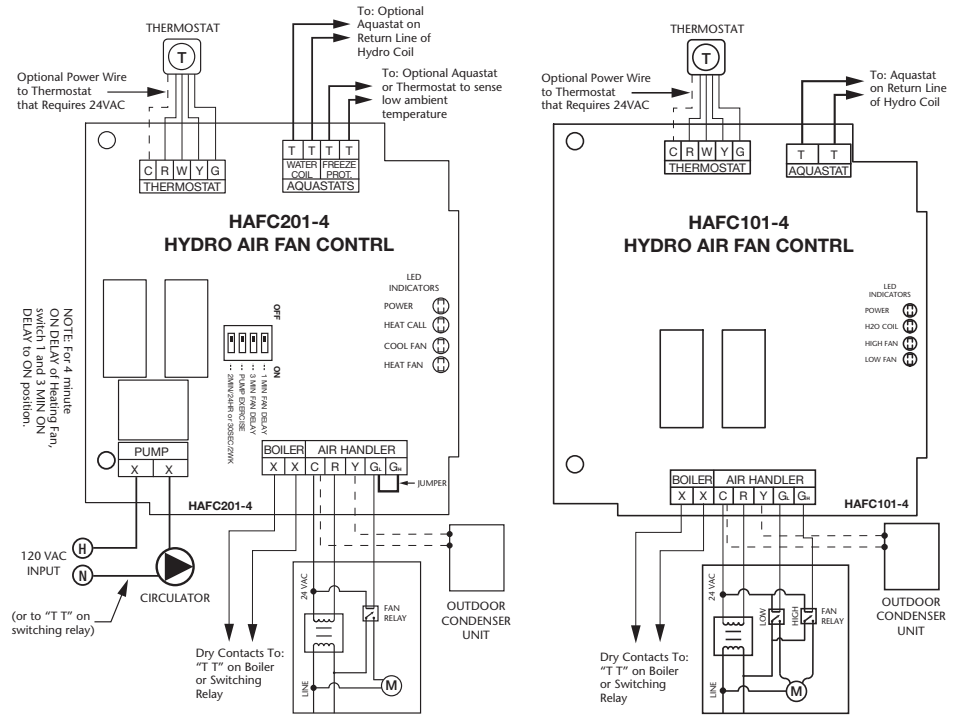
### Switch Settings (HAFC201):

- 1 1 minute on fan delay, in heating mode
- 2 3 minute on fan delay, in heating mode
- 1&2 4 minute on fan delay, in heating mode
- 3 Pump dry contact activated for 2 minutes every 24 hours (boiler contacts not activated)
- 4 Pump dry contacts activated for 30 seconds every two weeks (boiler contacts not activated)

### External Diagnostics:

The external lights show full functionality of the Hydro Air Fan Control. The green light should always be on, indicating that power is connected. Red lights indicate fan operation for heating and cooling modes.

**WARNING:** Wiring connections must be made in accordance with all applicable electrical codes. Use copper wire only. 120 VAC wiring must have a minimum temperature rating of 75°C. Failure to follow this instruction can result in personal injury or death and/or property damage. 12-18 gauge wire recommended for 120 VAC connections, 14-22 gauge wire for thermostat connections, and 14-22 gauge wire for 24 VAC source connections.



\* Both HAFC101 and 201 capable of 1 and 2 speed applications

### Terminal Description:

#### Thermostat:

- |   |  |   |                           |
|---|--|---|---------------------------|
| C | Optional: Common side of transformer to power some styles of thermostats | W | White - Heating signal    |
| R | Red - Hot side of transformer used to switch all functions               | Y | Yellow - Condenser signal |
|   |  | G | Green - Fan signal        |

#### Water Coil Aquastat:

TT Connect to aquastat at air handler to control operation of the fan when in the heating mode. Install a jumper if the aquastat is not used

#### Freeze Protection Aquastat:

TT Connect to aquastat or thermostat to sense low ambient temperature. Reduces the chance of pipes freezing by energizing the pump dry contacts.

#### Pump Dry Contacts:

XX May switch pump directly by bringing in external line voltage or connect to "T T" on a switching relay.

#### Boiler Dry Contacts:

XX Connect to the boiler or "T T" terminals on a switching relay.

#### Air Handler:

- C Common side of transformer to power the Fan Control
- R Red - Hot side of transformer used to switch all functions
- Y Yellow - Condenser signal

#### One Speed Motor:

G<sub>low</sub> Connect the fan to the relay. Keep the jumper installed between G<sub>high</sub> and G<sub>low</sub>.

#### Two Speed Motor:

Remove jumper and connect G<sub>high</sub> to the high speed fan relay and connect G<sub>low</sub> to the low speed fan relay.

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

### Specifications:

\*\* Model number changed from SR501-F

PRODUCT NUMBER	NUMBER OF ZONES	POWER INPUT VOLTAGE	MAXIMUM COMBINED LOAD	RELAY TYPE	THERMOSTAT CURRENT	SINGLE PHASE MOTOR RATING (RELAY)	DIMENSIONS OF ENCLOSURE		
							WIDTH	HEIGHT	DEPTH
HAFC101-4**	1 Zone	24 VAC Input	5 amps	DPDT	.18	1/6 HP(5A) @120VAC	4 1/4"	5 1/4"	2 3/4"
HAFC201-4	1 Zone	24 VAC Input	5 amps	DPDT	.18	1/6 HP(5A) @120VAC	4 1/4"	5 1/4"	2 3/4"

The Hydro Air Fan Controls are relay type DPDT, have a thermostat current of .18 and a single phase motor rating per zone of 1/6 HP (5A) @ 120 VAC.

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# Standard Terms and Definitions

**Switching Relay:** Transformer and relay in one box, which allows a low voltage thermostat to control a line voltage load (circulator), with an isolated end switch that can energize the boiler.

**Zone Valve Control:** Transformer and relay in one box, which allows a low voltage thermostat to control a low voltage zone valve, with an isolated end switch that can energize the boiler and/or circulators.

**Dry Contacts:** Set of relay contacts that make and break, where no voltage is present. Usually can switch 24 or 120 VAC.

**Isolated End Set Switch:** Set of dry contacts that make when a zone calls for heat. Usually connected to a boiler's aquastat TT.

**Mode Switch:** Switch set to **NORMAL** – When any zone calls for heat, the end switch will make and fire the boiler.

Switch set to **RESET** – When any zone calls for heat, a heat demand signal is given to external add-on reset control and it controls boiler operation. Also when the priority zone calls for heat and is switched to priority, the end switch will override reset control and fire boiler to high limit.

**TT:** Where thermostat or aquastat connects on a heating control.

**XX:** Denotes Isolated End Switch.

**Low Voltage:** 24 VAC for most HVAC systems.

**Line Voltage:** Normally 120 VAC relative to ground.

**H or L1:** Hot side of line voltage.

**N or L2:** Neutral side of line voltage.

**ZR:** 120 VAC (Hot) signal from switching relay to boiler's operating aquastat to fire the burner to high limit when any zone calls for heat. Also ideal for controlling primary circulator.

**ZC:** 120 VAC (Hot) signal from boiler's operating aquastat to switching relay allowing circulator(s) to run when aquastat is above the set low limit.

**Cold Start:** A boiler that fires only when there is a call for heat.

**Tankless Coil:** A method of heating domestic water utilizing a heat exchanger inside a boiler. The boiler also maintains heat year round to deliver hot water on demand.

**DHW Heater:** A method of heating domestic water utilizing a heat exchanger and storage tank.

**Transformer:** A component for increasing or reducing AC voltage. Rated in VA (volts x amps).

**OHMS Law:** Example: A 24 volt, 40 VA transformer can produce how much current?

$$\text{Current} = \text{VA} / \text{Voltage}$$

$$40 / 24 = 1.6 \text{ Amps}$$

$$I = E/R$$

where

I = Current in Amps

$$R = E/I$$

R = Resistance in Ohms

$$E = I \times R$$

E = Volts

$$W = E \times I$$

W = Watts or VA

$$I = W(\text{VA})/E$$

## RELAY CONTACTS:

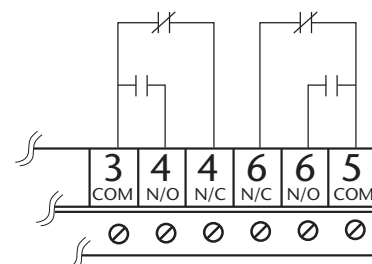
**N/C:** Normally closed connection of a relay, when not energized.

**N/O:** Normally open connection of a relay, when not energized.

**Com:** The common terminal for normally open and normally closed.

**Pole:** The number of independent circuits of a switch or relay.

**Throw:** The number of settings which a switch or relay can have.



**DPDT = Double Pole Double Throw**

# TACO Zone Controls Cross-Reference

	TACO	ARGO	ERIE	HONEYWELL
<b>SWITCHING RELAYS</b> 1 Zone Switching Relay (DPDT) 1 Zone Switching Relay 1 Zone Switching Relay with Outdoor Reset 2 Zone Switching Relay with Priority 3 Zone Switching Relay with Priority 4 Zone Switching Relay with Priority 6 Zone Switching Relay with Priority	SR501 SR501-HC SR501-OR SR502 SR503 SR504 SR506	AR822II AR-861-2II (3) AR-861-3II (3)	SR100 SR201 SR301 SR601 R601 (4)	RA89A (2), RA845A (1), RA832A (1), R8845U, RA889A
<b>EXPANDABLE SWITCHING RELAYS</b> 1 Zone Switching Relay with Priority 3 Zone Switching Relay with Priority 4 Zone Switching Relay with Priority 6 Zone Switching Relay with Priority	SR501-EXP SR503-EXP SR504-EXP SR506-EXP	ARM-3P (5,6) ARM-4P (5,6) ARM-6P (5,6)		AQ25042B (9)
<b>ZONE VALVE CONTROLS</b> 3 Zone Valve Control with Priority 4 Zone Valve Control with Priority 5 Zone Valve Control with Priority 6 Zone Valve Control with Priority	ZVC403 (7) ZVC404 (7) ZVC405 (7) ZVC406 (7)	AZ-3 AZ-4P AZ-5 AZ-6P	VL500 (8) VL500 (8)	
<b>EXPANDABLE ZONE VALVE CONTROLS</b> 4 Zone Valve Control with Priority 6 Zone Valve Control with Priority	ZVC404-EXP ZVC406-EXP			AQ25044B (9)

## TACO Zone Controls Cross-Reference (Continued)

	TACO	ARGO	ERIE	HONEYWELL
<b>ADD-ON POWER CONTROLS</b>				
Boiler Reset Control	PC700	DPM-2	BB1200	AQ25110B
2-Stage Boiler Reset Control	PC702		BB3000	AQ25400B
Variable Speed Pump Injection Mixing Control	PC705			
<b>FAN CONTROLS</b>				
1 Zone Hydro Air Fan Control (1 or 2 Speed)	HAFC101	ARH-1, ARH-2, ARH-3	WA300	
1 Zone Hydro Air Fan Control with Time Delays (1 or 2 Speed)	HAFC201			

**NOTES:**

1. Does not have both normally open and normally closed contacts.
2. Has only one set of normally open contacts (SPST).
3. Does not have optional priority.
4. Can be expanded to five and six zones with the addition of EXP10 relays.
5. Argo ARM units are expandable to 10 zones using special controls (ARM-1, ARM-4) with a phone jack.  
TACO switching relays can be expanded up to 120 zones using any combination of -EXP models with no special connections.
6. Includes only one data port for adding data port modules.
7. All TACO zone valve controls include an extra set of dry contacts (N/O, Common, N/C).
8. VL500 is only 5 zones, 4 normal and 1 priority.
9. Use with Honeywell AQ 1000 thermostats.

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