

FCX Oil-Fired Condensing Boiler

TACO Wiring Diagrams Switching Relays

Taco SR50_ Switching Relays

This document contains some basic wiring diagrams using the Taco SR50_ series of Switching Relays. These are simple systems for controlling the FCX. More complex and more featured systems are available such as set point, and set back controllers, but are generally not necessary for residential radiant systems. These diagrams were obtained from Taco literature and additions made to show the exact connections for the FCX. Originals can be obtained from the Taco website.

The advantage of the SR controllers over stand alone relays is the simplistic way that pumps are activated individually and the boiler is easily “cold started”. Additionally, the ZR/ZC option can provide further protection to the boiler through the addition of another thermostat that prevents the pumps from starting until the boiler is up to temperature. This can be important in large systems where there is a danger of dragging down the temperature for prolonged periods. See the explanation page for the ZR/ZC option.

The two diagrams shown are generic in nature and show two distinct methods of using the TACO switching relays. Both of these examples power 3 separate pumps, but do it in different ways. The SR503 example uses 3 inputs (the end switches are wired in parallel) and there is a one to one relationship of inputs to outputs. The SR506 example uses 6 individual inputs to control 3 pumps (the pump outputs are wired in parallel). The advantage of this is that each input activates an indicator light so it is readily apparent which individual circuit is on.

Also, a combination of these methods can be used. For instance, if you have a system with three heat emitters (one mixed output for radiant, two high temp such as DHW and a unit heater in the garage) and you want to use only 2 pumps (one for mixed and one for high temp), you would use zone valves instead of pumps and could use the SR502 and put the inputs of the DHW and unit heater in parallel. Or with the SR503 you would have individual inputs for the DHW and unit heater, but put the pump outputs in parallel. This would simplify the prioritization of the DHW if desired.

Taco Zone Controllers

To get the same functionality with many inputs, these switching relays can be chained together or Taco also has a series of Zone controllers that work similarly, but they are limited in the number of pumps they control. Each will control 2 pumps. The advantage here is that the zone valves are also powered by the controller (both input from the thermostat, output to the zone motor, and input from the end switch) is used. If you have multiple zone groups tied to individual pumps you will need more than one zone controller. These can be chained together. Note that different versions are not compatible. You can tell them apart, The older models have a metal case where the latest have plastic covers.

Taco ZR / ZC Control Terminals

http://www.taco-hvac.com/en/products/Electronic%20Controls/products.html?current_category=137&view=FAQList#

Q. What are the ZC and ZR terminals on the SR506 and how are they used?

ZC/ZR terminals on the SR board go to ZC/ZR terminals on the triple aquastat with ZC/ZR terminals, using minimum 14 gauge wires. These terminals will prioritize domestic water coil. When there is a demand for heat from the thermostat, ZR becomes hot, sending 120 volts to the triple aquastat. When the boiler temperature rises above the minimum temperature setting (typically 140°), ZC becomes hot, sending 120 volts to the SR board and powering the relay for the circulators. To recap, the circulators cannot run until the boiler is keeping up with demand.

[For the FCX, keep the jumper in place, wire ZR to the burner. To utilize the ZC power back option a second temperature sensor and control would be necessary to sense the minimum temperature that is desired for the circulators to operate. This could be used as a safety to keep the primary temperature up. The Johnson 419 would be ideal for this.]

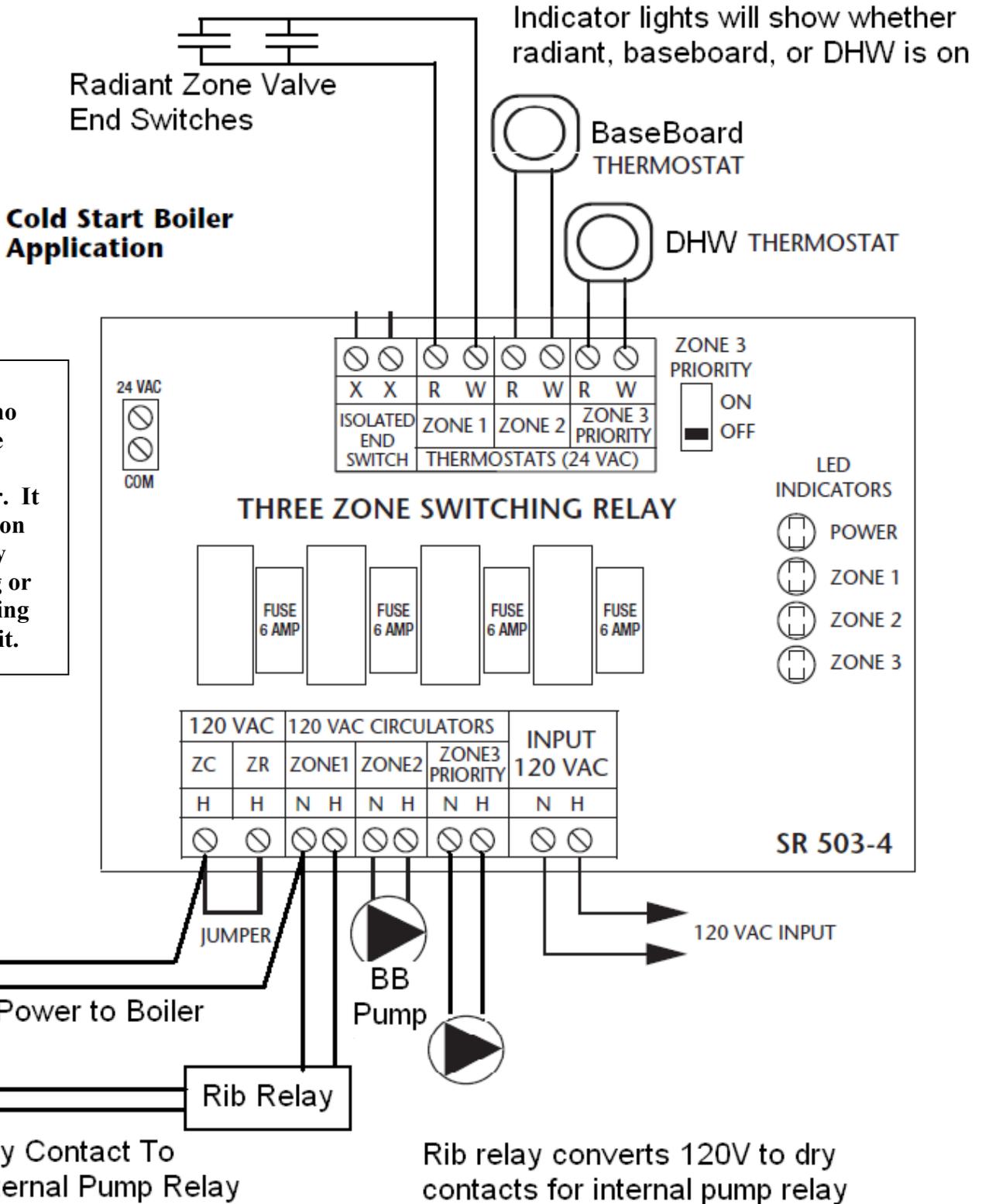
Q. I need technical details on how the ZR and ZC terminals interface with the aquastat on a boiler. I wire many boilers and all directions specify cold start or hot start, black box type instructions. I do not fully understand the inner workings, or what happens electrically with either application.

In our Control Instructions, we give two examples: a cold start boiler or a tankless coil boiler. For the cold start, the X, X goes to the TT terminals in the boiler control. For the tankless, the ZC and ZR go to the ZC, ZR terminals of the boiler. Boiler controls that don't have ZC and ZR terminals can be hooked like the cold start. These hook ups are conditional, in that you move the circulator that was originally wired to C1 and C2 over to the Taco Control.

If you plan to leave the circulator on the boiler aquastat, and a thermostat connected to the TT terminals of the aquastat, you will need to get into the firing circuit of the aquastat. This would be the ZR connection. Run a wire from the ZR of the aquastat to the ZR of the Taco control. If there is no ZR, run a black wire from the ZR of the Taco control to the B terminal of the aquastat.

When an aquastat has the ZC and ZR terminals, the ZC is connected to the low temperature switch of the aquastat and to the ZC terminal of the Taco control. The ZR is connected to the ZR. These will be 120 Volt wiring. When the boiler water temp is too low, the low limit switch connected to ZC opens and drops the voltage to the ZC of the Taco board, killing all the pumps until the boiler catches up. The ZR is a 120 Volt supply to the burner circuit to fire the boiler, but this goes through the high limit switch to control the boiler water temperature.

FCX Wiring for the Taco SR503-4 Three Pump Relay Riello Burners End Switches in Parallel for Multiple Zones



FCX Wiring for the Taco SR506-4 Using Three Pumps Riello Burners End Switches on Individual

Each zone has its own indicator

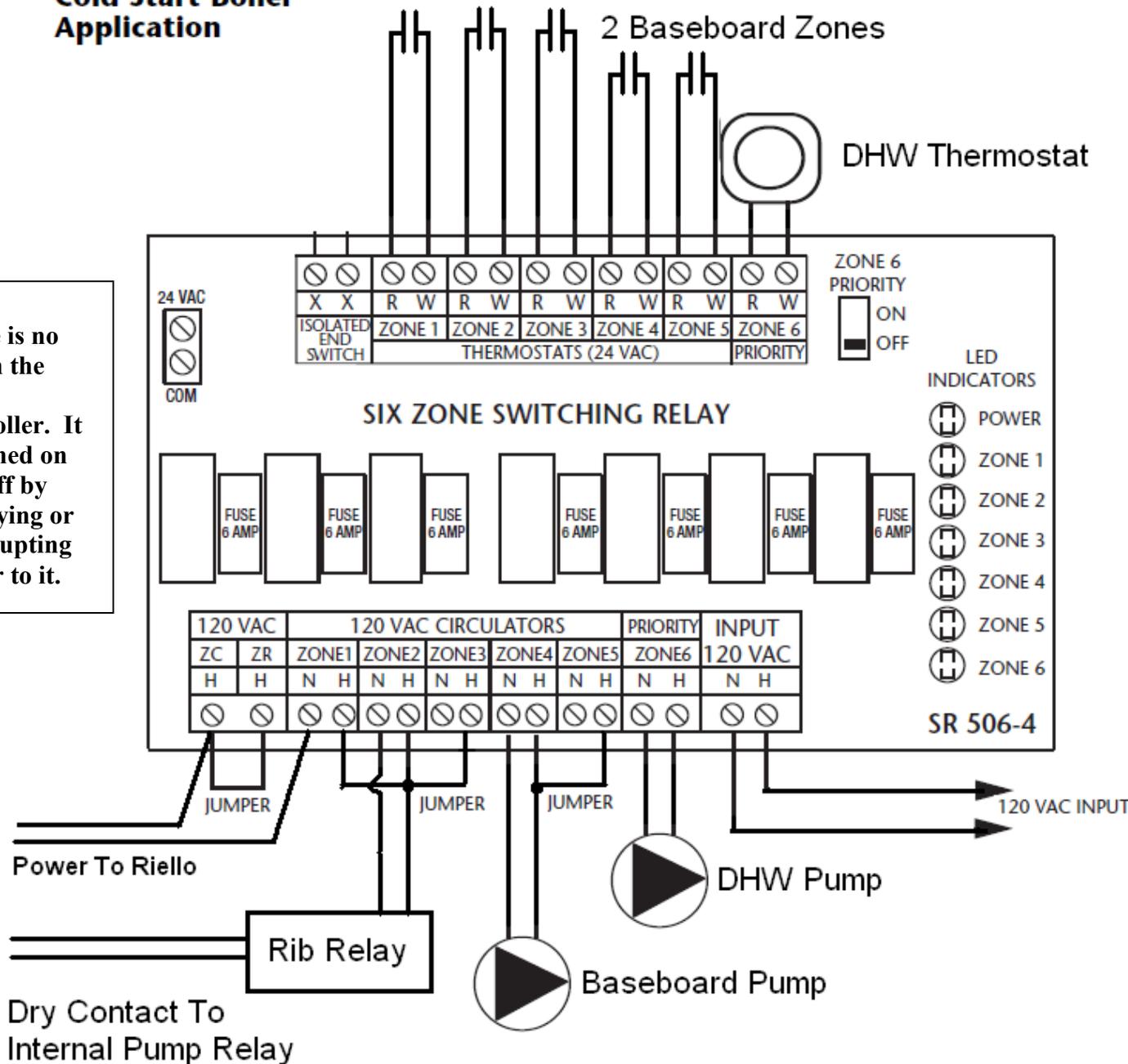
Cold Start Boiler Application

3 Radiant Zones

2 Baseboard Zones

DHW Thermostat

Note:
There is no TT on the Riello controller. It is turned on and off by supplying or interrupting power to it.



Jumpers cause any radiant zone or baseboard zone to activate their own pump