

# Instruction Sheet

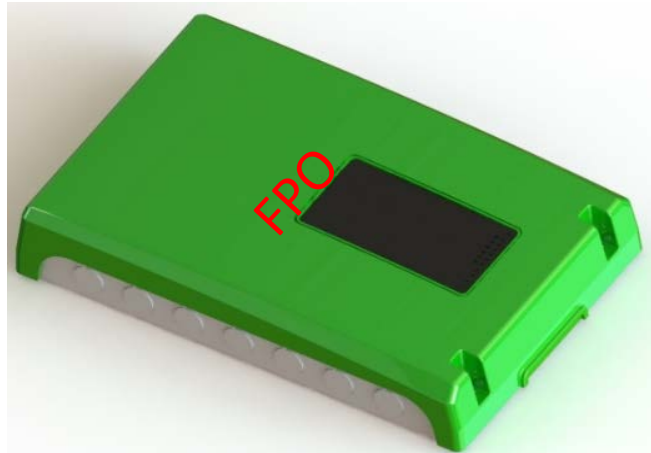
## SR506-5 Switching Relay

102-571

SUPERSEDES: New

Plant ID # 9300-4099

EFFECTIVE: February 17, 2021



For information on Taco's Switching Relays (SR) including catalog sheet, instruction sheets, Visio stencils and our highly praised Zone Controls Wiring Guide, scan the QR code to the left or go to our website: [www.TacoComfort.com](http://www.TacoComfort.com).

### Overview:

The SR506-5 is a six zone switching relay that can have up to 6 thermostats connected and will operate up to 6 zone circulators, plus 2 auxiliary outputs (AUX) to control circulators; like boiler and primary loops.

The SR506-5 has a priority zone option, allowing zone 1 to operate and deactivate zones 2 through 6 during a priority call; this is ideal for when using an indirect water heater.

The SR506-5 includes timing options for Post Purge, Pump Exercise and Priority Protection. The SR506-5 includes an energy saving program that can adjust the temperature of a modulating-condensing boiler or conventional On/Off boiler to increase the comfort level and use less fuel, without the need to install an outdoor sensor.

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# 1. Warnings & Safety Information:

## FCC Regulatory Statements

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.
- (2) This device must accept any interference received, including interference that may cause undesired operation.

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the Federal Communication Commission (FCC) rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment causes harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by doing one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

NOTE: THE GRANTEE IS NOT RESPONSIBLE FOR ANY CHANGES OR MODIFICATIONS NOT EXPRESSLY APPROVED BY THE PARTY RESPONSIBLE FOR COMPLIANCE. SUCH MODIFICATIONS COULD VOID THE USER'S AUTHORITY TO OPERATE THE EQUIPMENT.

## RF Exposure Warning

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. In order to avoid the possibility of exceeding the FCC radio frequency exposure limits, human proximity to the antenna shall not be less than 20 cm during normal operation and must not be co-located or operating in conjunction with any other antenna or transmitter.

**ISED Regulatory Statements** This device complies with ISED Canada license-exempt RSS standard(s). Operation is subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.

Le présent appareil est conforme avec ISED Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes: (1) l'appareil ne doit pas produire de brouillage, et (2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

CAN ICES-3 (B)/NMB-3(B)

## RF Exposure Information

This equipment complies with ISED RSS-102 radiation exposure limits set forth for an uncontrolled environment. This transmitter must be installed to provide a separation distance of at least 20 cm from all persons and must not be co-located or operating in conjunction with any other antenna or transmitter.

Cet équipement est conforme avec ISED RSS-102 des limites d'exposition aux rayonnements définies pour un environnement non contrôlé. Cet émetteur doit être installé à au moins 20 cm de toute personne et ne doit pas être colocalisé ou fonctionner en association avec une autre antenne ou émetteur.

**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. Based on current draw; 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.

## 2. Location & Installation:

### Planning:

#### Included in Package:

SR506-5 switching relay; six zone

2 Spare fuses attached to inner cover

#### Tools & Material Needed:

Small straight blade screwdriver

Phillips screwdriver

Torpedo level

Wire strippers

**Location:** Do not mount to a surface that exceeds 104°F (40°C). The unit must be only located in dry interior locations. Use only copper conductor supply wire suitable for at least 105° C. All circuits must have a common disconnect and be connected to the same pole of the disconnect. Product is not suitable for installation in hazardous locations.

Instruction sheet

Strap-on temperature sensor

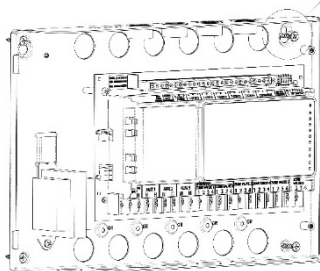
Screws or hardware for mounting

Electrical connectors for field wiring

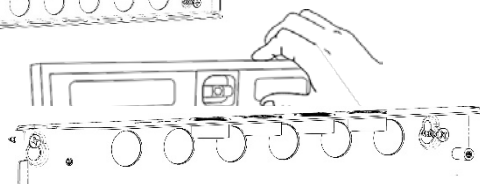
Low and live voltage wiring (per code)

### Installation:

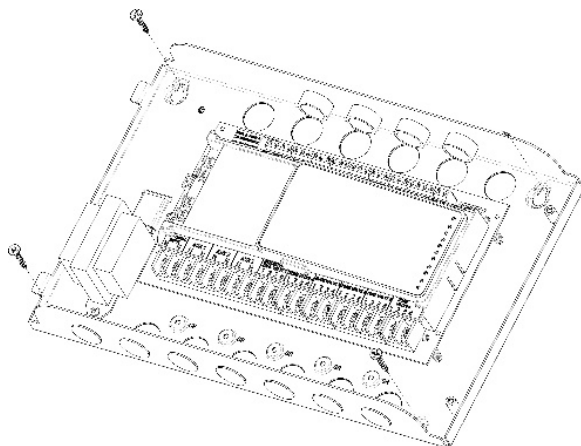
1. Hang the panel on a wall with one mounting screw.



2. Level the panel.



3. Install other 3 mounting screws



3. Operation & Dip Switch Settings:

**General Operation:** When any thermostat calls for heat, the appropriate circulating pump is energized, the red light goes on and the boiler end switch relay and AUX circulator relay(s) are energized.

**Expansion Connections:** Set dip switch (#1) to MASTER on the switching relay that is designated as the priority zone control. Set all other daisy chained zone controls to EXPANSION. Using thermostat wire (18-22 gauge) connect between terminals 1, 2, 3 on the master control to the corresponding 1, 2, 3 on the expansion zone control(s). Zone controls may be daisy chained up to 20 Taco zoning panels using any combination of SR and ZVC controls (120 zones if all are 6 zone panels).

**Priority Operation:** When the priority dip switch (#2) is set to ON and the priority zone (zone 1) is actuated, all other zones will stop operation until priority zone is satisfied. When not switched to priority, all zones will operate independently. More adjustments are available when using the eLink mobile app.

**Priority Protection Operation:** 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.

**Primary Pump Operation:** When the dip switch (#3) 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 (#4) 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. More adjustments are available when using the eLink mobile app.

**Pump Exercise Operation:** When the dip switch (#5) is set to ON, the solid state timer cycles all the circulating pumps that are attached to the Switching Relay to run for 30 seconds every 2 weeks. More adjustments are available when using the eLink mobile app.

**Low Limit (ZC) Operation:** When the dip switch (#6) 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.

**AUX 1; ZR /Circulator Output:** The AUX 1 output is energized when any zone calls for heat. More adjustments are available when using the eLink mobile app.

**AUX 2; Primary Circulator Output:** The AUX 2 output follows dip switch setting # 3 listed above. More adjustments are available when using the eLink mobile app.

**SmartPlus® Recirc Logic:** SmartPlus adds intelligence to your system by learning when hot water is used in the home. The pipe-mounted sensor records daily hot water usage patterns during the course of the week. Recorded data is used to automatically run the circulator at the same times the following week. So hot water is always available when it is needed. If usage pattern changes, the SmartPlus adjusts automatically.

**“Smart” Mode** (default mode): the SmartPlus logic will run in Pulse mode as described below for the first 7 days of operation. During the first 7 days, the SmartPlus logic monitors and records the home's hot water usage pattern. For the following 7 days, the SmartPlus logic will use the preceding week's usage pattern to cycle the pump during the recorded hot water usage times. This process of recording and repeating is continuous, and automatically adjusts the pump "ON" times to match the house hold's usage pattern.

**“Pulse” Mode:** When set to Pulse mode, the SmartPlus logic will cycle the circulator pump "ON" for 5 minutes, then “OFF” for 10 minutes to maintain hot water at all faucets and taps. It will repeat the cycle continuously. More adjustments are available when using the eLink mobile app.

When a sensor is connected to the Recirc sensor input, zone 2 output will now be designated for recirculation of DHW loop and activated based on DHW usage.

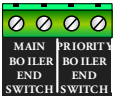
DIP SWITCH					
ON- EXPANSION	ON- ZONE 1 PRIORITY	ON- PRIMARY PUMP /AUX 2	ON- POST PURGE	ON- PUMP EXERCISE	ON- ZC LOW LIMIT
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
MASTER	OFF	OFF	OFF	OFF	OFF
1	2	3	4	5	6

4. Wiring Procedure:

End Switches (Low Voltage Dry Contacts):

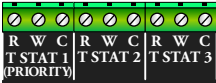
**Main** The main end switch closes when any zone thermostat calls for heat and connects to T-T on boiler operating control.

**Priority** The priority end switch closes only when the priority zone thermostat or aquastat is calling for heat and connects to DHW T-T on boiler (optional).



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).



Expansion Connections: (optional)

- 1** Connect 1 on Master zone control to 1 on all Expansion zone control(s).
- 2** Connect 2 on Master zone control to 2 on all Expansion zone control(s).
- 3** Connect 3 on Master zone control to 3 on all Expansion zone control(s).



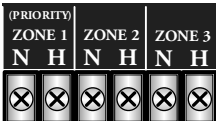
Power Input (120 vac):

- H** Connect to 120 vac Hot side of power supply to zone control.
- N** Connect to 120 vac Neutral side of power supply to zone control.
- G** Connect ground wire to ground screws on base of zone control.



Circulator Output; Zones 1-6 (120 vac):

- H** Connect the Hot output to Hot power input on circulator.
- N** Connect the Neutral output to Neutral power input on circulator.
- G** Connect ground wire to ground screws on base of zone control.

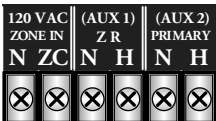


Circulator Output; ZR / AUX 1 (120 vac):

- H** Connect the Hot output to Hot power input on circulator (or to ZR; see below).
- N** Connect the Neutral output to Neutral power input on circulator.
- G** Connect ground wire to ground screws on base of zone control.

Circulator Output; Primary / AUX 2 (120 vac):

- H** Connect the Hot output to Hot power input on circulator.
- N** Connect the Neutral output to Neutral power input on circulator.
- G** Connect ground wire to ground screws on base of zone control.

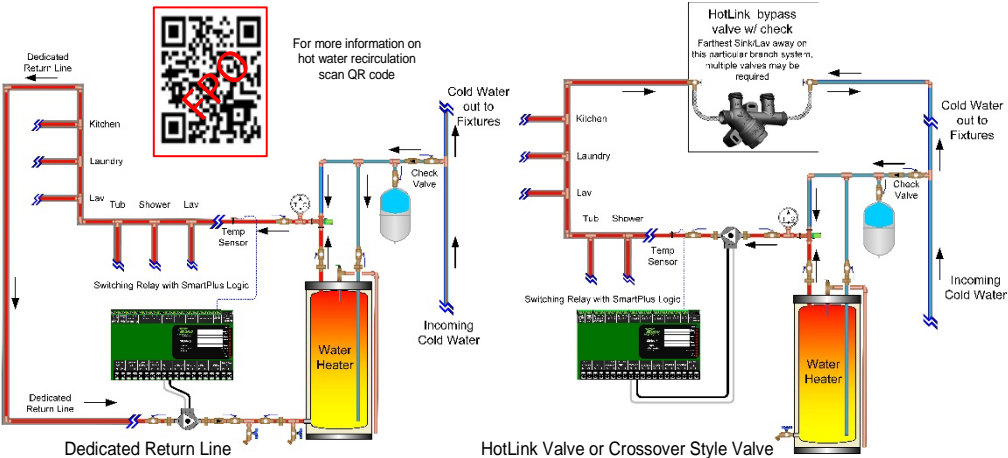


Low Limit Aquastat / Tankless Coil Application (120 vac):

- ZR - H** Connect the Hot ZR (AUX 1) output to ZR input on boiler's operating control.
- ZR - N** Neutral (optional).
- ZC - H** Connect the ZC input to ZC (Hot) output on boiler's operating control.
- ZC - N** Connect (optional).

SmartPlus Recirc Logic Sensor

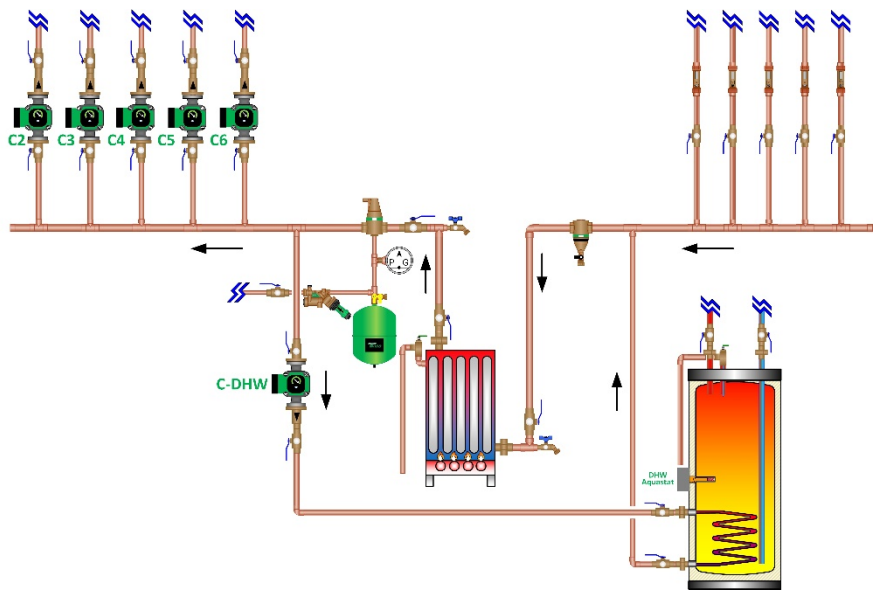
- Mount the strap-on sensor on domestic hot water supply pipe on water heater using wire tie or pipe clamp and insulate sensor with pipe insulation.
- Connect the strap-on sensor to the two terminals labeled Recirc Sensor on switching relay.



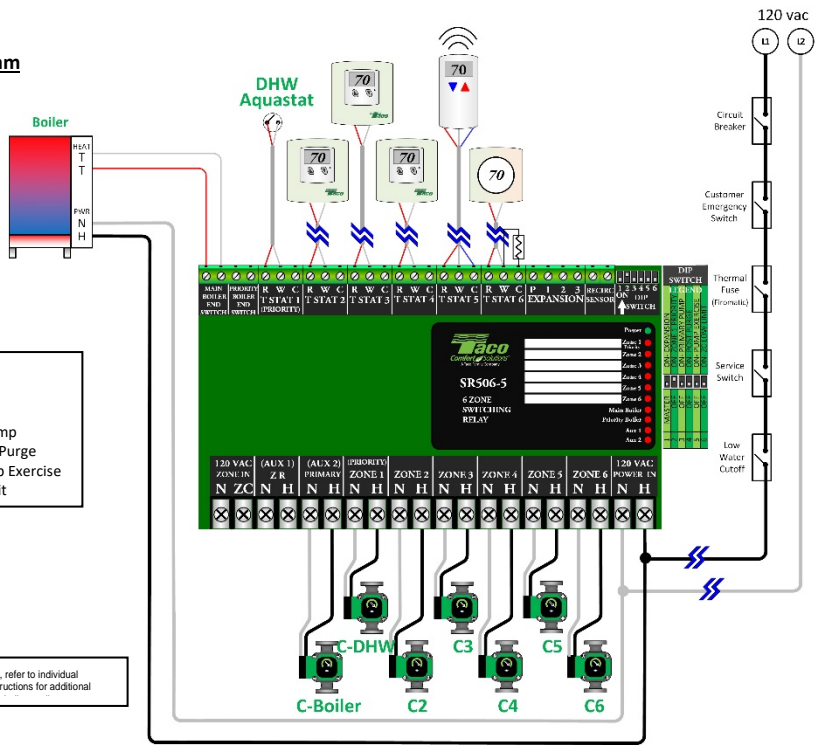
5. Product & Applications Diagrams:

PA01-C - SR506-5 with 5 Zone Circulators & Indirect DHW; Supply & Return Headers

Mechanical Diagram

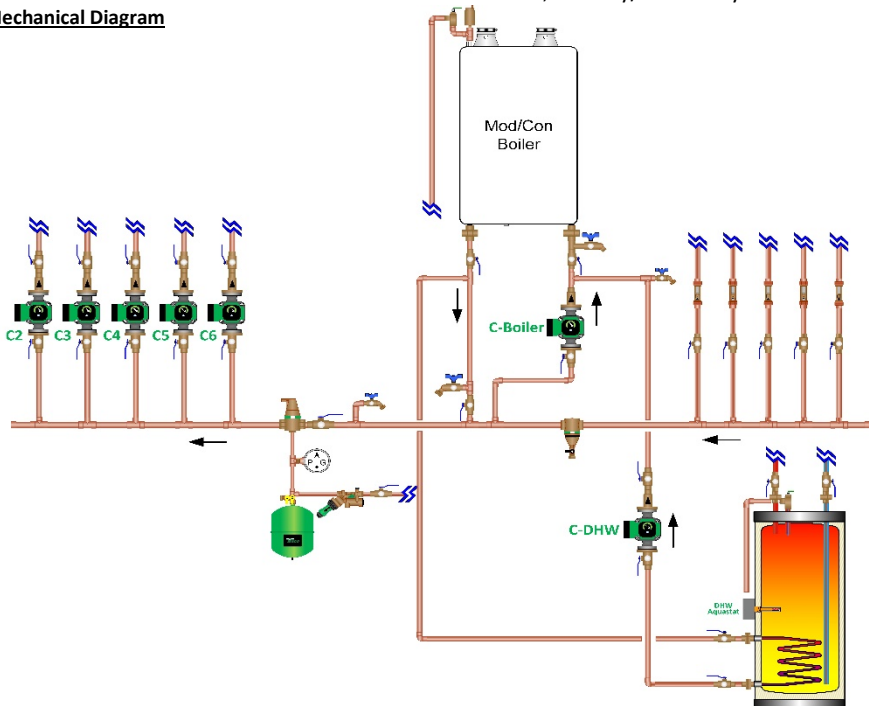


Electrical Diagram

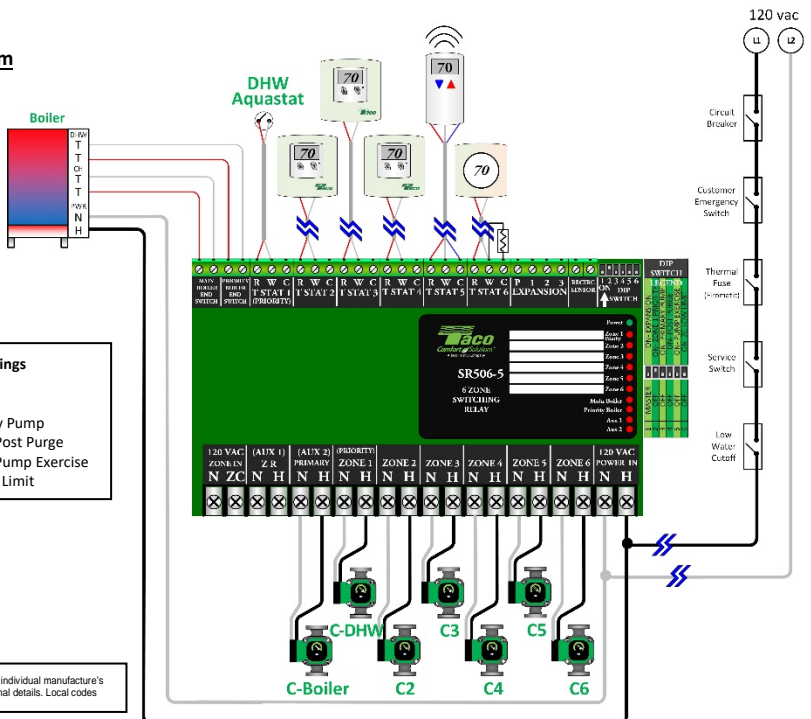


Conceptual Sketches Only, refer to individual manufacturer's installation instructions for additional

### Mechanical Diagram



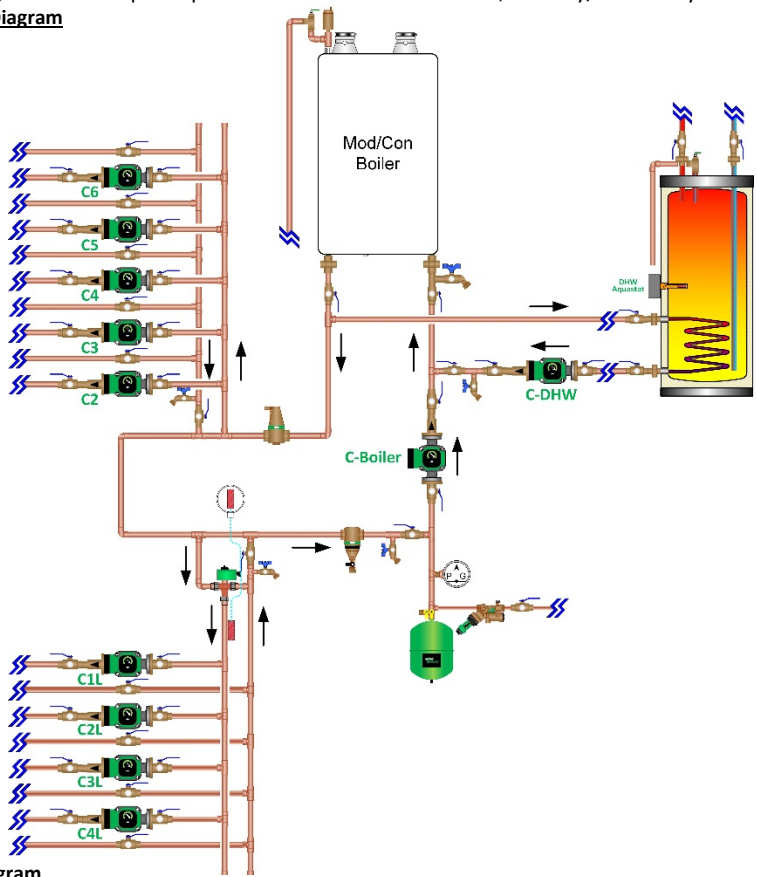
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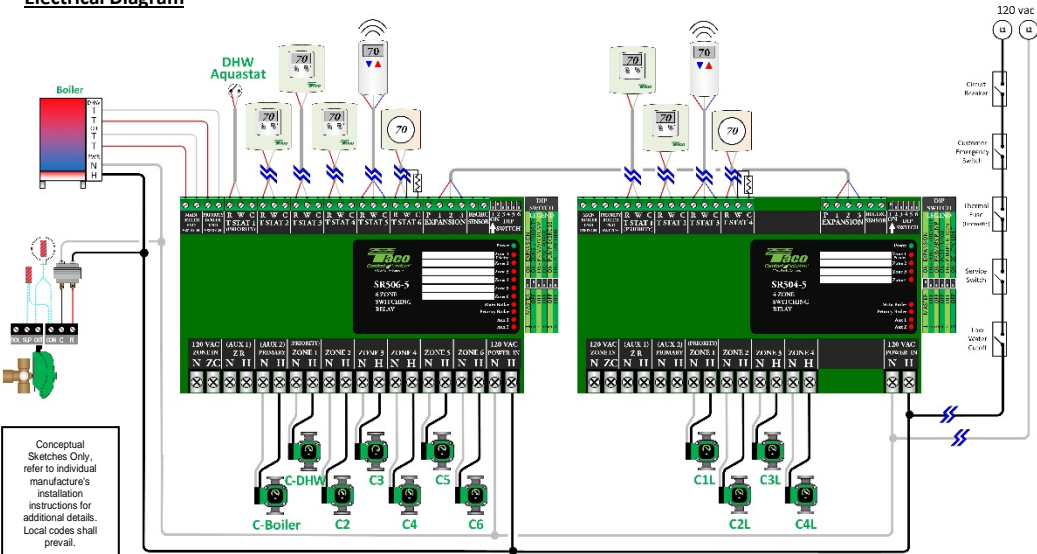
Conceptual Sketches Only, refer to individual manufacture's installation instructions for additional details. Local codes

PA03-C –High & Low Temp Temperature Zones & Indirect DHW; Primary/Secondary

Mechanical Diagram



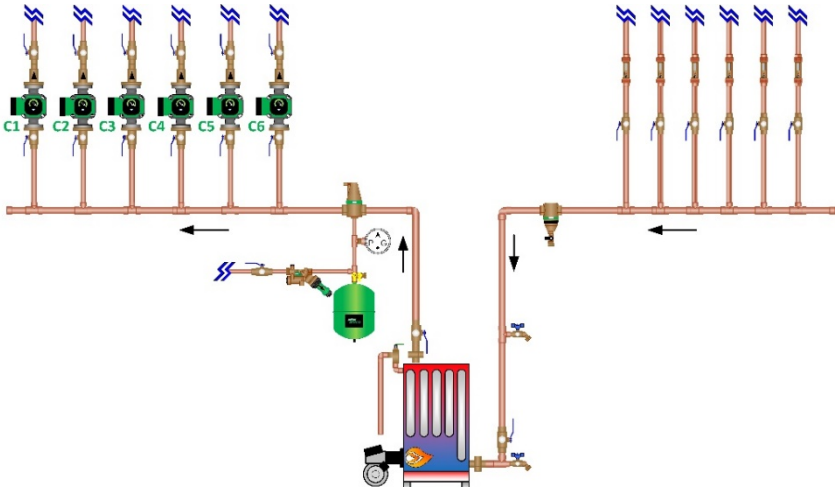
Electrical Diagram



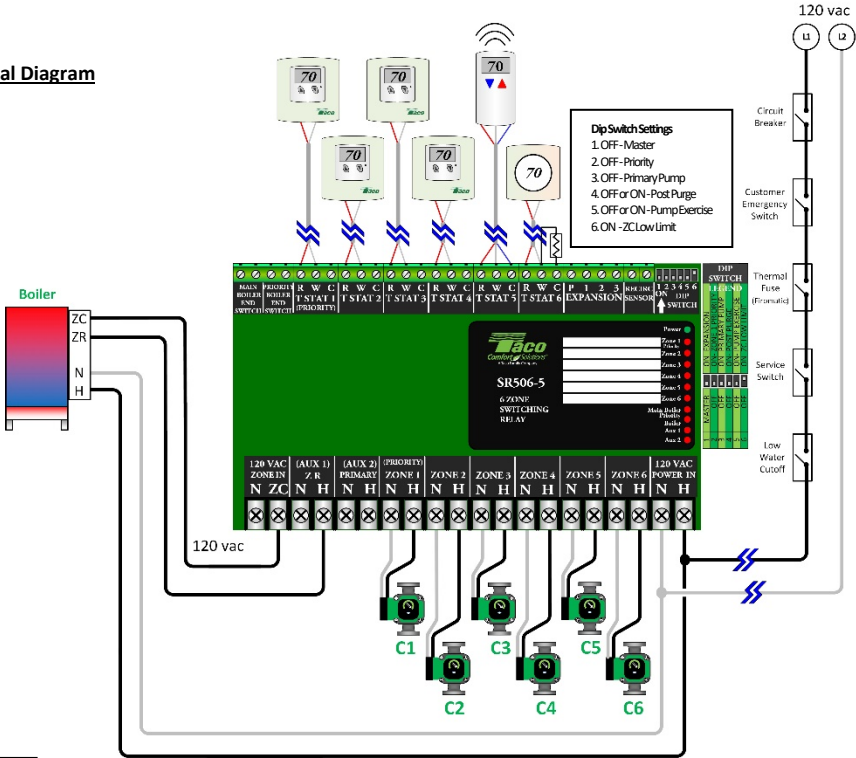


PA04-C – Oil Fired Boiler with Tankless Coil; Supply & Return Headers

Mechanical Diagram



Electrical Diagram



SAFETY NOTICE

**TWO SEPARATE sources of power may be connected to an oil boiler's aquastat control.**  
Before servicing an oil fired boiler make sure the service switch is off. Then confirm that a secondary source of power does not exist to the boiler's aquastat control. Failure to fix the problem could result in boiler being activated when zone calls for heat, that could result in serious injury or death.

6. Reset Control Setup & Wiring (Optional)

**Boiler Reset Types:** The ZVC406-5 includes two types of boiler reset control logic:

Indoor Reset Control (Load Reset) uses the thermostat cycling information to determine the supply water temperature. Thermostat short cycling usually indicates supply water temperature is too high. Long on cycles usually indicates supply water temperature is too low.

Outdoor Reset Control uses an outdoor sensor to compare it against the reset ratio (configured by installer) to determine the appropriate supply water temperature.

**General Operation:** 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 circulator relay(s). The boiler end switch relay and modulating output will be controlled by the reset algorithm. either based on indoor thermostat operation or on outdoor temperature.

**Control Setup:** The Taco eLink mobile app is required to set type of reset control and parameters to operate. See section 7 for more information on the Taco eLink mobile app.

**Wiring of Reset Control:**

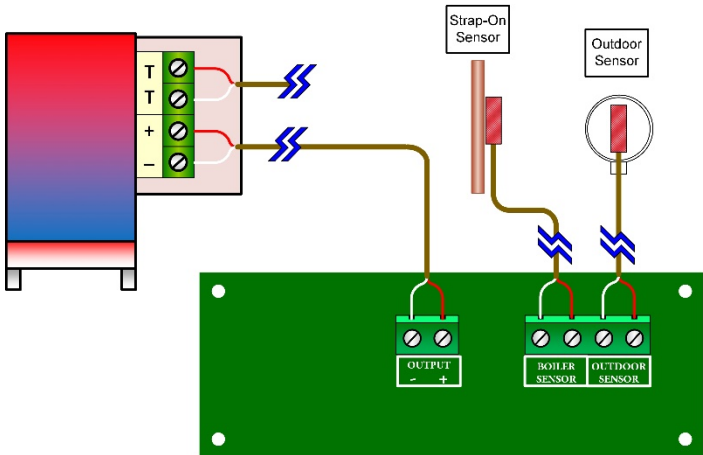
Remove the inner cover as shown in section 10, page X of this manual to have access to wire.

**Sensor Connections:**

- Boiler Sensor: A boiler supply sensor is required for either indoor or outdoor reset. Wire the supplied strap-on sensor to the Boiler Sensor terminal block.
- Outdoor Sensor: An outdoor sensor is required when utilizing the outdoor reset function. Connect Taco sensor P# 9300-2052RP to Outdoor Sensor terminal block and mount on north side of building.

**Boiler Connections:**

- Modulating Output: Most Mod-Con boilers have an input for an external modulating signal (0-10 vdc or 4-20 ma) to control boiler. Connect the modulating output to appropriate input terminals on boiler; noting that the polarity is correct. Some Mod-Con boilers also require a T T call for heat to activate boiler. In this case, wire the Main Boiler End Switch to T T input on boiler.
- Dry Contact End Switch: ON/OFF boilers are controlled by the Main Boiler End Switch on zone control. Wire the Main Boiler End Switch to T T input on boiler.



## 7. The Taco eLink Mobile App (Optional)

**Note:** The Taco eLink mobile app is not required for standard installations.

**Advanced Control & Monitoring Options:** The Taco eLink mobile app is required for advanced control functions and parameters to operate. Search for Taco eLink within the App Store or Google Play on your mobile device to download the mobile app.



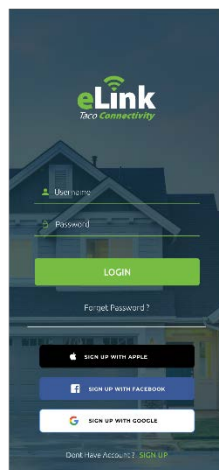
iOS



Android OS

Follow the app menu to configure advanced features that the Taco new zone controls have to offer, including;

- Different levels of access
- Zone naming
- Programmable output naming
- Alerts & messages
- Post purge time delay adjustment
- Pump exercise time delay adjustment
- Priority protection time delay adjustment
- Indoor boiler reset
- Outdoor boiler reset
- SmartPlus® DHW recirculation logic
- AUX 1 output behavior
- AUX 2 output behavior
- AUX 3 output behavior
- Cooling function
- Zone association







## 8. Trouble Shooting & FAQ's

For your convenience, the Taco Tech Support team is available anytime 24/7. Just call 401-942-8000 for help.

**Problem:** Digital thermostats do not work correctly when connected to a switching relay.

**Solution:** Some thermostats are a "Power Stealing" type which means they are powered by the switching relay with just 2 wires (**R & W**). A resistor may be needed in order to have the thermostat work properly. This resistor should be placed between the **W & C (common)** terminals of the switching relay. If the thermostat manufacturer does not supply a resistor, a 1000 ohm ½ watt resistor has proven to work with most.

**Problem:** No heat in a zone or room of building.

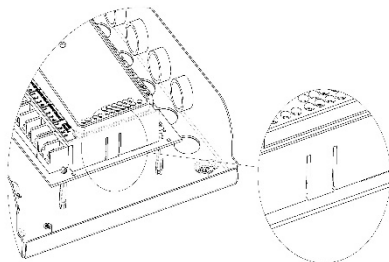
**Solution:** LED diagnostic lights will help find a component that is not working properly. The green LED should always be on, indicating that power is connected, and the solid-state fuse is good. When there is a call for heat, the red LED will come on indicating power to the zone circulator. This indicates the thermostat is working correctly. If the red LED does not come on, then check the thermostat and thermostat wiring for errors.

**Problem:**

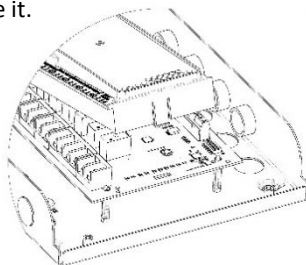
**Solution**

## 9. Inner Cover Removal & Fuses:

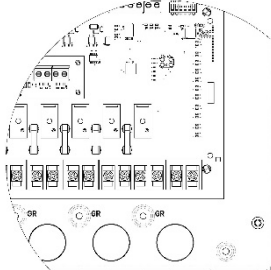
1. Gently push in tab in with finger on side of inner cover.



2. Lift cover and hinge up to remove it.



3. Fuses are replaceable; with 2 spare fuses attached to inner cover near transformer.



10. Specifications:

Power and Electrical Ratings:

**Power Supply:** 120VAC ±10%, 60Hz, 20A

**Zone Pump Output Rating:**

120 Vac, 1/6 HP

**AUX(s) Pump Output Rating:**

120 Vac, 1/6 HP

**Boiler End Switch Contact Rating:**

24 Vac, 1A,

**Boiler Modulating Output Rating:**

0-10 VDC Mode; 500 Ω min impedance

4-20 mA Mode; 1k Ω max impedance

**Expansion Terminals:** Low voltage, 3-wire polarity-sensitive, digital communications that links other Switching Relays (SR-5), Zone Valve Controls (ZVC-5) and other Modbus equipment.

**Electrical Terminals (Line Voltage):**

Wire Range Min / Max: 12-24AWG

Torque: 7.0 lbs-in. Max.

**Electrical Terminals (Low Voltage):**

Wire Range Min / Max: 12-28AWG

Torque: 3.5 lbs-in. Max.

**Transformer Rating:**

40 VA, 24 Vac Class II

**ZC Input Rating:**

120 VAC

Environmental Ratings:

**Ambient Temperature Rating:**

32°F to 104°F (0°C to 40°C)

**Operating Humidity Range (% RH):**

5 to 90% RH, noncondensing

**Sensor Temperature Rating:**

-58°F to 230°F (-50°C to 110°C)

**DIP Switch Timing Settings:**

**Post Purge:** 30 seconds; adjustable with mobile app.

**Pump Exercise:** 30 seconds per 2 weeks of space heating inactivity; adjustable with mobile app.

**Thermostat Compatibility:** Compatible with most mechanical, battery operated, power-stealing (power-robbing), hardwired and “Smart” thermostats.

**Temperature Sensor:** 10K ohm NTC

thermistor at 77°F (25°C) ± 0.5°F (±0.3°C).

Lead length: 7ft. (m); up to 500 ft. (150 m) using 18 AWG or larger wire, beta=3892.

**Dimensions (HxWxD):** 15.6 x 8.7 x 2.7 in.

(39.5 x 22.0 x 6.8 cm) approximate

**Weight:** lb. (kg)

**Approvals:** UL, FCC,

11. Accessories & Replacement Parts

Item	Part Number
Strap-on sensor for boiler reset control or SmartPlus logic -----	9300-2044RP
Outdoor sensor for outdoor boiler reset and smart pump exercise -----	9300-2052RP
Circulator output fuses; slow blow, 6 amp, 2AG (5mm X 15mm) -----	SR6A-001RP
Low voltage fuses; slow blow, ? amp, 2AG (5mm X 15mm) -----	?
Transformer; 40 VA at 24 VAC with connectors to plug into board -----	9300-4107RP

## 12. LIMITED WARRANTY STATEMENT

Taco, Inc. will repair or replace without charge (at the company's option) any product or part which is proven defective under normal use within three (3) years from the date of start up or three (3) years and six (6) months from date of shipment (whichever occurs first) Need date code wording...

In order to obtain service under this warranty, it is the responsibility of the purchaser to promptly notify the local Taco stocking distributor or Taco in writing and promptly deliver the subject product or part, delivery prepaid, to the stocking distributor. For assistance on warranty returns, the purchaser may either contact the local Taco stocking distributor or Taco. If the subject product or part contains no defect as covered in this warranty, the purchaser will be billed for parts and labor charges in effect at time of factory examination and repair.

Any Taco product or part not installed or operated in conformity with Taco instructions or which has been subject to misuse, misapplication, the addition of petroleum-based fluids or certain chemical additives to the systems, or other abuse, will not be covered by this warranty.

If in doubt as to whether a particular substance is suitable for use with a Taco product or part, or for any application restrictions, consult the applicable Taco instruction sheets or contact Taco at [401-942-8000].

Taco reserves the right to provide replacement products and parts which are substantially similar in design and functionally equivalent to the defective product or part. Taco reserves the right to make changes in details of design, construction, or arrangement of materials of its products without notification.

TACO OFFERS THIS WARRANTY IN LIEU OF ALL OTHER EXPRESS WARRANTIES. ANY WARRANTY IMPLIED BY LAW INCLUDING WARRANTIES OF MERCHANTABILITY OR FITNESS IS IN EFFECT ONLY FOR THE DURATION OF THE EXPRESS WARRANTY SET FORTH IN THE FIRST PARAGRAPH ABOVE. THE ABOVE WARRANTIES ARE IN LIEU OF ALL OTHER WARRANTIES, EXPRESS OR STATUTORY, OR ANY OTHER WARRANTY OBLIGATION ON THE PART OF TACO.

TACO WILL NOT BE LIABLE FOR ANY SPECIAL, INCIDENTAL, INDIRECT OR CONSEQUENTIAL DAMAGES RESULTING FROM THE USE OF ITS PRODUCTS OR ANY INCIDENTAL COSTS OF REMOVING OR REPLACING DEFECTIVE PRODUCTS.

This warranty gives the purchaser specific rights, and the purchaser may have other rights which vary from state to state. Some states do not allow limitations on how long an implied warranty lasts or on the exclusion of incidental or consequential damages, so these limitations or exclusions may not apply to you.



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