

HEAT-TIMER

INSTALLATION/OPERATING INSTRUCTIONS

ZONE CONTROL PANEL

Control Panel for Multi-Zone Hydronic Heating Systems

DESCRIPTION

The ZCP is designed to work with multi-zone hydronic heating systems that may include radiant and/or baseboard and/or other types of radiation. The pre-wired panel may be powered with either 120V or 24VAC. The zone thermostats receive constant 24VAC power even during domestic hot water priority. When a zone thermostat calls for heat, either a zone valve is powered with 24VAC or a relay contact energizes to control a 120V zone pump. If the zone valve has an end switch, the boiler will be energized as soon as the end switch makes. If using zone pumps, the boiler will be energized as soon as the thermostat calls.

Each ZCP can handle up to four zones. Multiple panels can be cascaded together to provide as many outputs as there are zones.

The ZCP has a selectable built-in Domestic Hot Water Priority. When the Domestic Hot Water aquastat calls for heat, the Domestic Hot Water pump is energized. Zones can be individually selected to turn off during this period. For instance, the bedroom could remain heated while the den and living room would not have heat so the domestic tank can quickly be satisfied. In addition, the ZCP monitors boiler firings. During low usage periods, the ZCP can be selected to not energize the Domestic Hot Water pump until the boiler has been preheated. This prevents cold boiler water from decreasing the temperature of the Domestic Hot Water storage tank.

FEATURES

- LED indicator lights show when each thermostat is calling for heat, when each zone is active, and when the boiler contacts are active.
- Zone pumps are activated with N.O. relays. These relays can switch 120V 1/3HP.
- Zone valve outputs are automatically energized with 24VAC when the zone thermostat calls for heat.
- The ZCP is compatible with most 24VAC thermostats.
- Domestic Hot Water Priority does not interrupt power to the zone thermostats.
- Selectable power source. The unit can be wired with 120V line voltage as long as the total draw of all four zone valves does not exceed 25VA. If the total valve current draw exceeds 25VA, then the ZCP can accept a 24VAC input with sufficient VA to power the valves.
- Domestic Hot Water Priority only disables the heat to selectable zones. Only if a zone is selected as LOW priority will that zone valve or pump be disabled during a call for Domestic Hot Water.
- Domestic Hot Water Priority monitors when the boiler was last fired. If the boiler has been off for an extended period of time when the domestic hot water aquastat calls, the boiler can be preheated before the Domestic Hot Water pump is energized.
- Any combination of zone valves and zone pumps may be used.
- The ZCP has inputs for zone valve end switches. If valves with end switches are being used, then when any end switch is made, the boiler is energized. If pumps or valves without end switches are used, the boiler will fire whenever the zone thermostat calls for heat.
- The boiler output is a N.O. relay contact capable of switching up to 120V 1/6HP.
- ZCPs can be cascaded together to accommodate as many zones as are in the heating system.

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WARNING

This Heat-Timer control is strictly an operating control; it should never be used as a primary limit or safety control. All equipment must have its own certified limit and safety controls required by local code. The installer must verify proper operation and correct any safety problems prior to the installation of this Heat-Timer control.

INSTALLATION

WIRING POWER

If using Zone Valves (with or without the Domestic Hot Water Priority)

- Determine the power requirements (measured in VA or W) for each zone valve.
- Add up the zone valve power requirements. Do not include the power requirements of any pumps in the system.

Use the Internal Transformer

- If the total zone valve power requirements is less than 25VA then wire the 120VAC power input on the right hand side of the board. Bring 120 VAC 60Hz 40W into the LINE and NEUTRAL terminals.

Use the External Transformer

- If the total zone valve power requirements is more than 25VA then an external transformer will need to be added by using the following procedure:
 1. The power rating of the external transformer must be at least 5VA greater than the total calculated above.
 2. The power side of the transformer must be connected to 120VAC.
 3. The 24VAC side of the transformer must be connected to the terminals marked EXTERNAL INPUT.
 4. The jumper marked INTERNAL POWER must be cut.

NOTE: Do not connect LINE and NEUTRAL

If using Zone Pumps

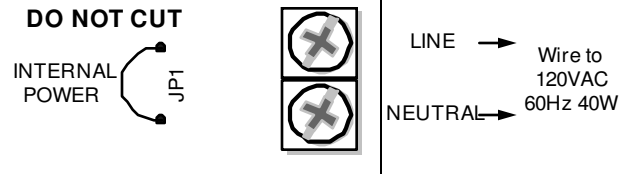
- Wire 120 VAC 60Hz 40W into the LINE and NEUTRAL terminals on the right hand side of the board.
- The AUX 24VAC OUTPUT may be used to power any 24VAC equipment as long as the power requirements do not exceed 25VA.

WIRING THERMOSTATS

- Each zone will need one thermostat input (which may come from multiple zone valve end switches, see pg. 13).
- The thermostats will receive 24V power at all times, even during a call for domestic hot water in priority mode. This helps to insure thermostats with setback clocks keep time correctly and increases battery life.
- Connect the thermostat wires marked W and R or W and RH to the ZCP terminals marked THERMOSTAT W and R respectively.
- If using a bimetal thermostat, set the Heat Anticipator to the minimum setting.

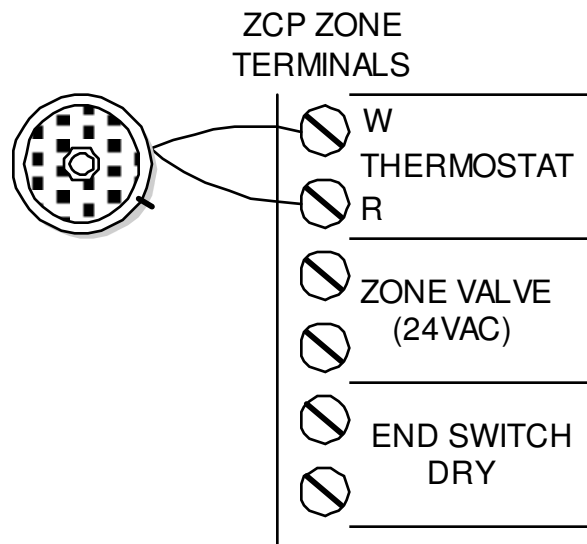
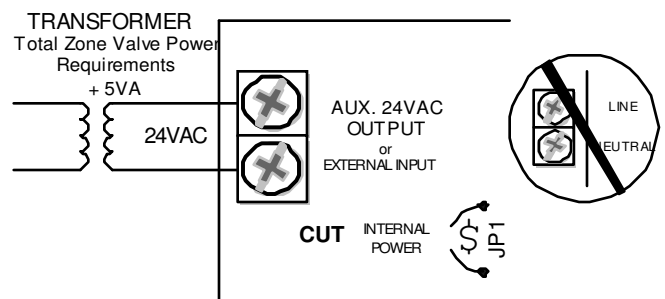
Zone Valve Power Less than 25VA

Example: 3 Zone Valves each rated at 4VA
 Total Zone Valve Power Requirements
 = 3 x 4VA = 12VA



Zone Valve Power Greater than 25VA

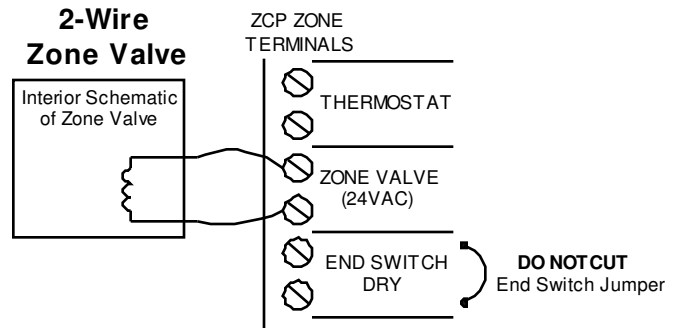
Example: 4 Zone Valves each rated at 8VA
 Total Zone Valve Power Requirements
 = 4 x 8VA = 32VA



WIRING ZONE VALVES

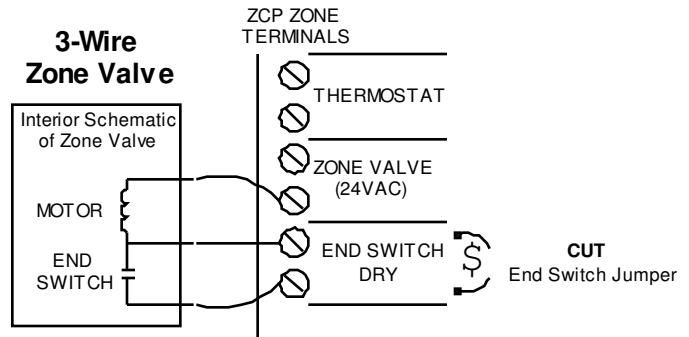
If using a Two Wire Zone Valve

- Attach the 24V zone valve motor wires to the terminals marked ZONE VALVE.
- Do not connect any wires to the terminals marked END SWITCH.
- **DO NOT cut the jumper next to the END SWITCH terminals.**



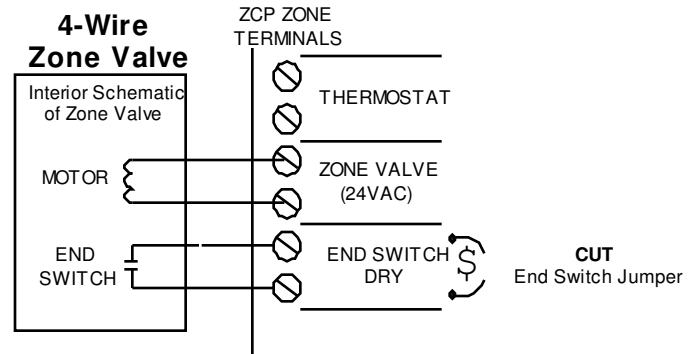
If using a Three Wire Zone Valve

- The zone valve consists of a 24V motor connection, a common connection, and an end switch connection (see Zone Valve wiring pg. 15 for your specific valve).
- Do not connect the ZONE VALVE terminal next to the THERMOSTAT input.
- Attach the other ZONE VALVE terminal to the motor connection.
- Attach the END SWITCH terminal next to the ZONE VALVE input to the common connection
- Attach the remaining END SWITCH terminal to the end switch connection.
- Cut the jumper next to the END SWITCH terminal.



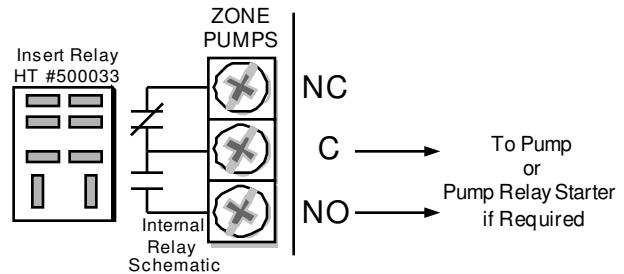
If using a Four Wire Zone Valve

- The zone valve consists of a 24V motor and an end switch (see Zone Valve wiring pg. 15 for your specific valve).
- Attach the ZONE VALVE terminals to the motor connections.
- Attach the END SWITCH terminals to the end switch connections.
- Cut the jumper next to the END SWITCH terminal.



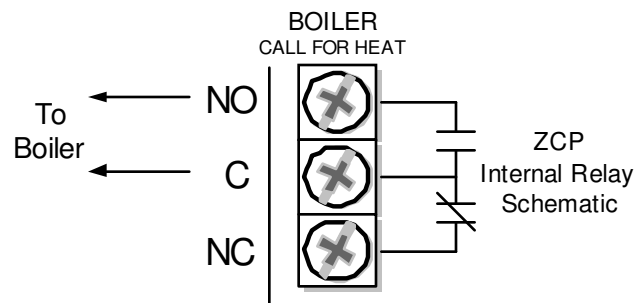
WIRING ZONE PUMPS

- Each stage which is to activate a zone pump must have a pump relay (HT#500033).
- Insert the relay into the corresponding stage socket.
- The zone pump outputs are dry contacts only. They do not output any power.
- The ZCP pump relays are rated 6A Resistive 1/3HP at 120VAC.
- The total output for all the zone pumps is 15A.
- Wire the Common (C) and Normally-Open (N.O.) outputs to the pump relay.



WIRING THE BOILER OUTPUT

- The boiler outputs are dry contacts only. They do not output any power.
- The boiler output is rated 3A Resistive.
- Wire the Common (C) and Normally-Open (N.O.) outputs to the boiler.



ZONE PRIORITIES

The heating system may be configured so the hot boiler water heats a domestic hot water tank, as well as the heating zones. When this is the case, it is customary to shut down the heating zones when the domestic hot water tank is calling for heat so the tank can be heated up rapidly. This is called Domestic Hot Water Priority.

The ZCP can be configured to turn off all the heating zones on a domestic hot water call. However, it can also leave on one or more selected zones during the domestic hot water call. This means the heat to those particular zones will not be interrupted. For example, most domestic hot water calls are in the morning when occupants are taking showers and getting ready for work. During this time, it may be desirable to leave the heat on in the bedrooms and bathrooms. However, interrupting heat to the living room and dining room will not cause any discomfort since they are not being used.

Finally, if there are more than 3 heating zones in addition to the domestic hot water, a second ZCP can be added to the system. All the zones on the second panel may be shut down when the domestic hot water tank calls for heat (see CASCADING PANELS pg. 6).

Wiring the Domestic Hot Water

- Zone 1 of the primary panel should be used for the domestic hot water. Wire the domestic hot water into the ZONE 1 THERMOSTAT connection.

If using a domestic hot water pump, wire the pump into the Common (C) and Normally-Open (NO) contacts of ZONE 1.

If using a zone valve for domestic hot water, wire the zone valve to ZONE 1 as described on opposite page.

Setting Zone Priorities with Domestic Hot Water

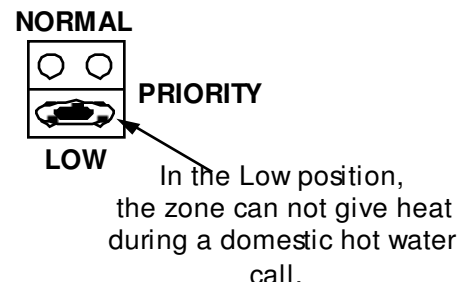
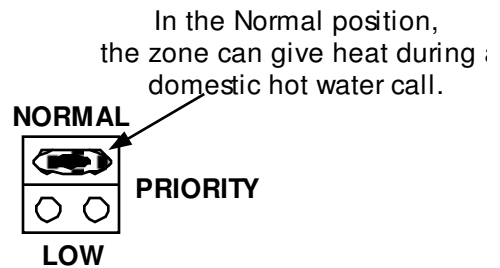
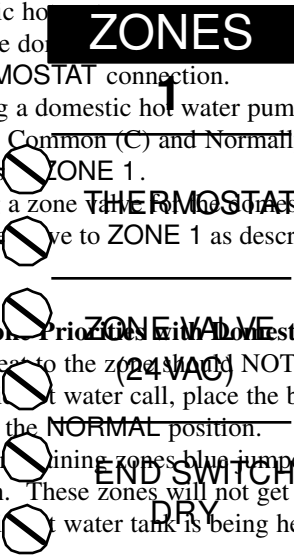
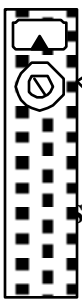
If the heat to the zone should NOT be interrupted on a domestic hot water call, place the blue jumper for the zone in the NORMAL position.

- Set the heating zones blue jumper to the LOW position. These zones will not get heat while the domestic hot water tank is being heated.

Setting Zone Priorities with NO Domestic Hot Water

- Set the blue jumper for each zone in the NORMAL position.

Domestic Hot Water
Aquastat



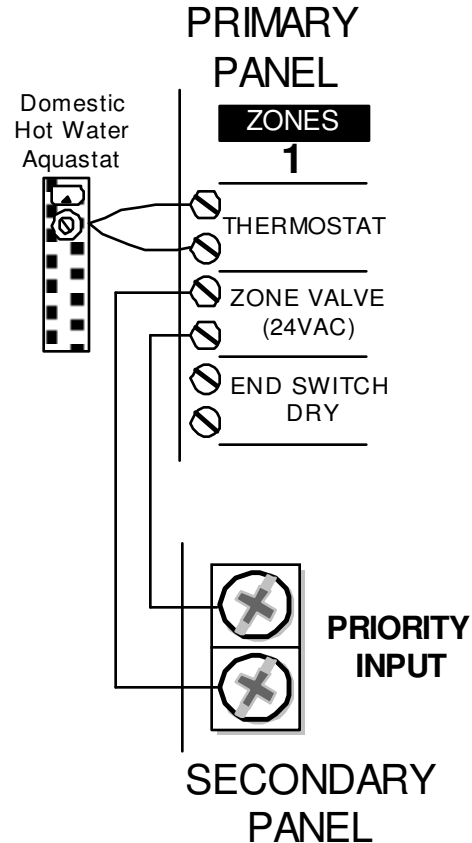
CASCADING PANELS

Wiring a Secondary Panel with Domestic Hot Water Priority

- Wire the PRIORITY INPUT on the secondary panel to the ZONE VALVE 1 output of the primary panel. If using a zone valve for the domestic hot water, wire them both in parallel across this output.
- Wire both panels NO-C BOILER outputs in parallel as described on pg. 4.
- Set the priorities on each stage of the primary panel as described on pg. 5.
- All the zones on the secondary panel will be turned off when the domestic hot water tank calls for heat. None of these zones will remain active while the domestic hot water tank is heating
- Set the blue jumper for each stage on the secondary panel to the NORMAL position.

Wiring a Secondary Panel with NO Domestic Hot Water Priority

- All zones on each panel will have equal priority. When any zone calls, the boiler will be activated.
- Set the blue jumpers on each panel to the NORMAL position.
- Do not connect the PRIORITY INPUT.
- Wire both panels NO-C BOILER outputs in parallel as described on pg. 4.



THE BOILER PREHEAT TIMER

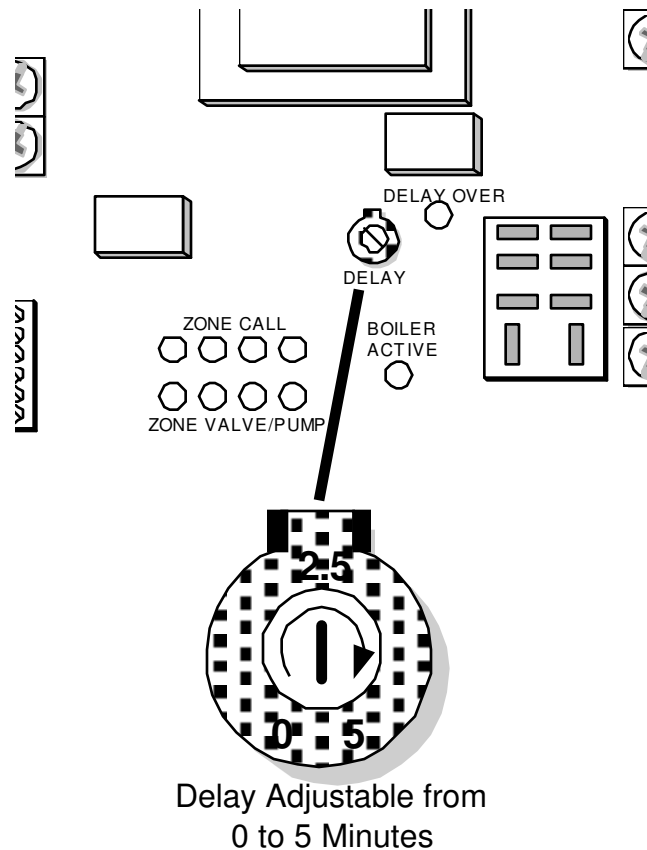
The boiler preheat timer is designed to be used with a domestic hot water tank. When the domestic hot water aquastat calls for heat, the boiler water is pumped through a coil in the domestic tank. If the boiler water is hot, then the tank will begin to heat up immediately.

However, in the summer months (or any other time the boiler may have been off for an extended period of time) the boiler water will be cold. If this cold boiler water is pumped through the domestic hot water tank, the temperature of the tank will actually decrease until the boiler heats up to the temperature of the tank.

To prevent this, a timer is built into the ZCP. When the boiler has been off, the first stage (and only the first stage) output is delayed while the boiler heats up.

Setting the Boiler Preheat Timer

- The boiler preheat timer knob is located near the BOILER ACTIVE light.
- The timer knob is shipped with the knob turned fully counterclockwise for no delay. If not using the first stage for domestic hot water, leave the knob fully counterclockwise.
- If using a domestic hot water tank, adjust the knob clockwise for up to 5 minutes of delay.



OPERATION

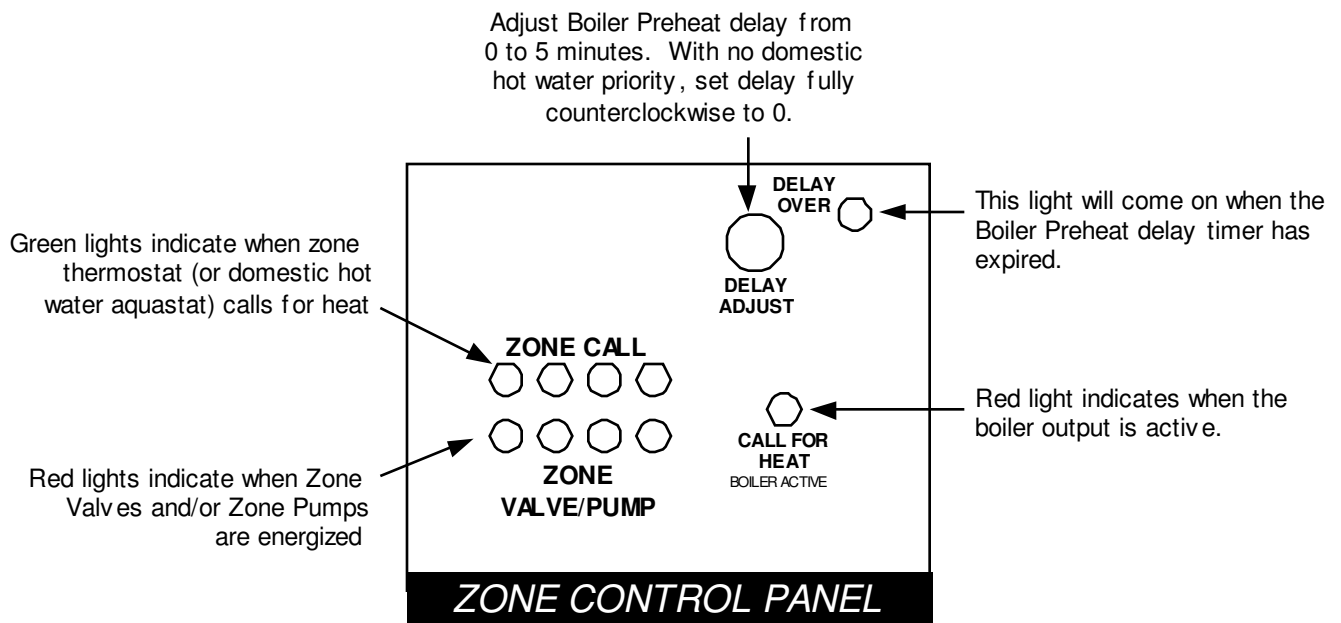
Green **ZONE CALL** lights - These lights indicate when a zone thermostat is calling for heat. The ZONE CALL lights follow the zone thermostats only, the zone valve or pump may not be active because of the boiler preheat timer or because of domestic hot water priority.

Red **ZONE VALVE/PUMP** lights - These lights show when a zone valve and/or pump relay has been activated by the ZCP. When any zone thermostat calls for heat (the green ZONE CALL light is on), the red ZONE VALVE/PUMP light should also be on unless one of the following is true:

1. The end switch of the zone valve has not been made (if the END SWITCH JUMPER has been cut).
2. There is a domestic hot water call, and this particular zone has a LOW priority.
3. The zone is the domestic hot water zone (ZONE 1), and the DELAY OVER light is not on.
4. The priority input is active.

Red **CALL FOR HEAT** light - This light shows when the boiler (or outdoor reset control) output has been activated. The CALL FOR HEAT light should be on whenever a zone thermostat calls for heat (the green ZONE CALL light is on.) and the zone valve end switch is made (if the END SWITCH JUMPER has been cut).

Green **DELAY OVER** light - This light will come on whenever the Boiler Preheat timer has expired (see opposite page). The Boiler Preheat timer will begin counting down whenever the boiler (or outdoor reset control) has been activated. This means that any zone can cause the DELAY OVER light to come on. However, only the domestic hot water zone's (ZONE 1) valve and/or pump relay will not be energized until the DELAY OVER light comes on.



TROUBLESHOOTING

No Green ZONE CALL lights - Place a jumper wire across the ZONE 4 THERMOSTAT input. If the green light for ZONE CALL 4 does not come on, check the power to the ZCP (either 120V input or the external transformer input, see pg. 3). If the power input is correct the ZCP may be damaged. Call the factory for further support. If the green light does come on, check the thermostat inputs to the ZCP. If none of the zone thermostats (nor the domestic hot water aquastat) are calling, none of the green lights will be on. Use the jumper wire to short out the ZONE THERMOSTAT input of any thermostat which you believe is calling for heat. If the green light comes on when the input is jumpered, then the problem is with the thermostat or the wiring, not with the ZCP.

Green ZONE CALL lights are on, but the red CALL FOR HEAT light is not on - The red CALL FOR HEAT light will not come on until the zone valve END SWITCH contacts are made. Use a jumper wire to short out the END SWITCH contacts for the zone whose green light is on. If the red CALL FOR HEAT light comes on, the zone valve's end switch output is not working or is not wired correctly.

Red CALL FOR HEAT light is on, but the boiler is not running - Remove the boiler wires from the ZCP. Check the Common to Normally Open terminals for continuity. If the output terminals are continuous, the ZCP is working properly. Check the boiler.

Domestic Hot Water green ZONE CALL 1 light is on, but the ZONE VALVE/PUMP 1 light is not on - First check to see if the green DELAY OVER light is on. If it is not, wait for 5 minutes. When the green DELAY OVER light comes on, the red ZONE VALVE/PUMP 1 light should also come on. If the DELAY OVER light is on, use a jumper wire to short END SWITCH 1. If the red ZONE VALVE/PUMP 1 light comes on now, the zone valve end switch may not be working properly.

NORMAL PRIORITY Zones green ZONE CALL lights are on, but the corresponding ZONE VALVE/PUMP lights are not on - Use a jumper wire to short the END SWITCH of the zone in question. If the red ZONE VALVE/PUMP light comes on now, the zone valve end switch may not be working properly.

LOW PRIORITY Zones green ZONE CALL lights are on, but the corresponding ZONE VALVE/PUMP lights are not on - Check to see if the green ZONE CALL 1 light is on. If it is, this low priority zone is disabled because the domestic hot water tank is being charged. If the domestic hot water tank is hot, the domestic aquastat may not be working correctly. If the green ZONE CALL 1 light is not on, use a jumper wire to short the END SWITCH of the zone in question. If the red ZONE VALVE/PUMP light comes on now, the zone valve end switch may not be working properly.

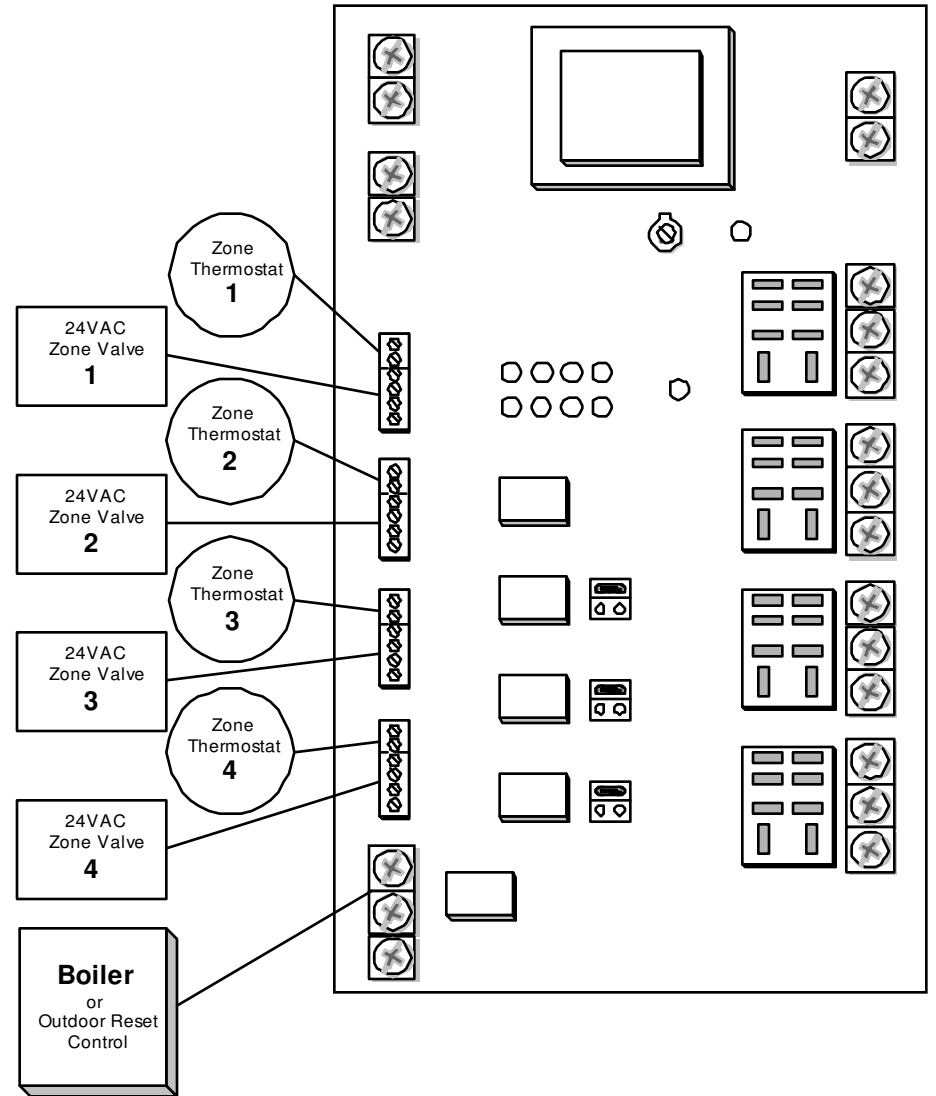
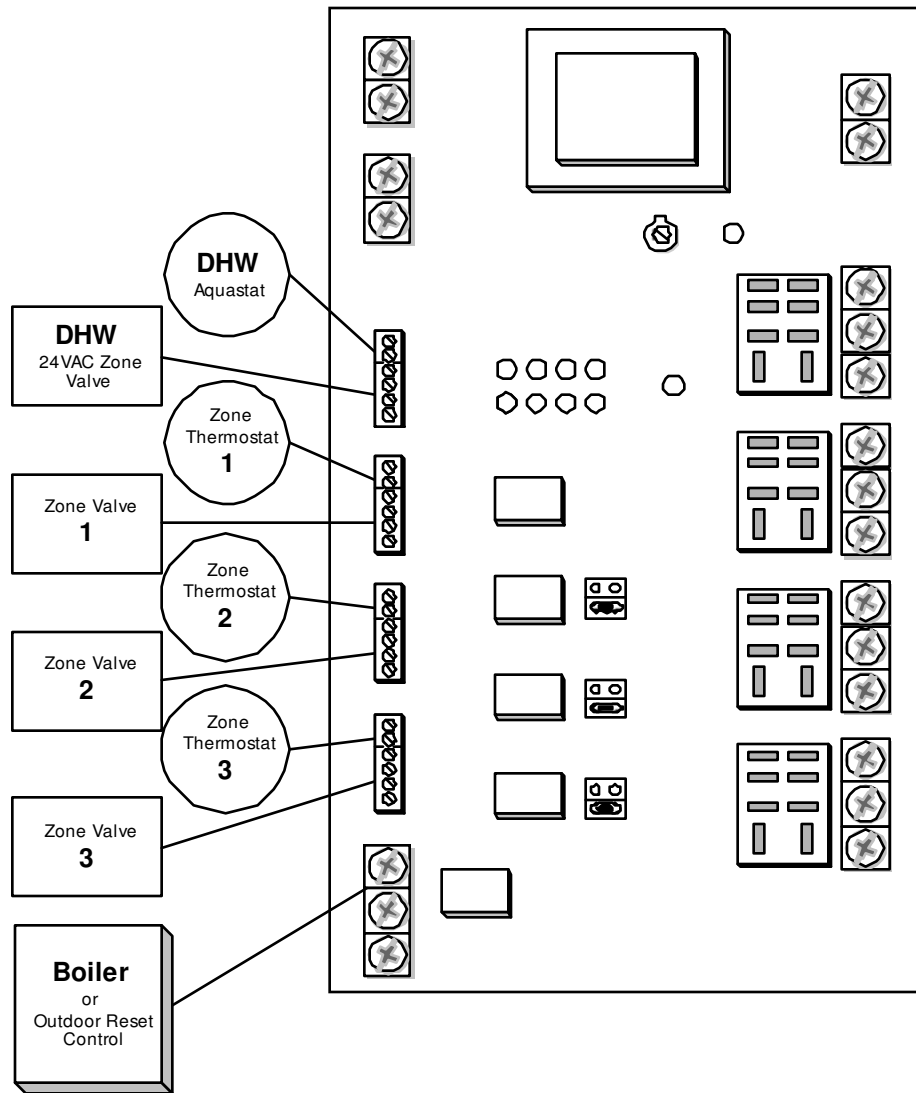
The red ZONE VALVE/PUMP light is on, but the zone valve is not working - Remove the wires going out to the zone valve. Check for 24VAC across the ZCP ZONE VALVE outputs. If there is 24VAC, then the ZCP is working correctly. Check that the zone valve was wired properly and has not been damaged.

The red ZONE VALVE/PUMP light is on, but the zone pump is not working - Remove the wires going out to the zone pump. Check for continuity across the ZCP ZONE PUMP output. If there is continuity, then the ZCP is working correctly. Check that the pump was wired properly and has not been damaged. If there is not continuity across the contacts, check that the stage has the plug-in relay (HT#500033) inserted in the socket. If possible, use a relay from another (working) stage to test if the relay has been damaged.

TYPICAL WIRING DIAGRAMS

**DHW 24VAC Zone Valve
Up to 3-24VAC Heating Zones**

**Up to 4-24VAC Heating Zones
No DHW Priority**

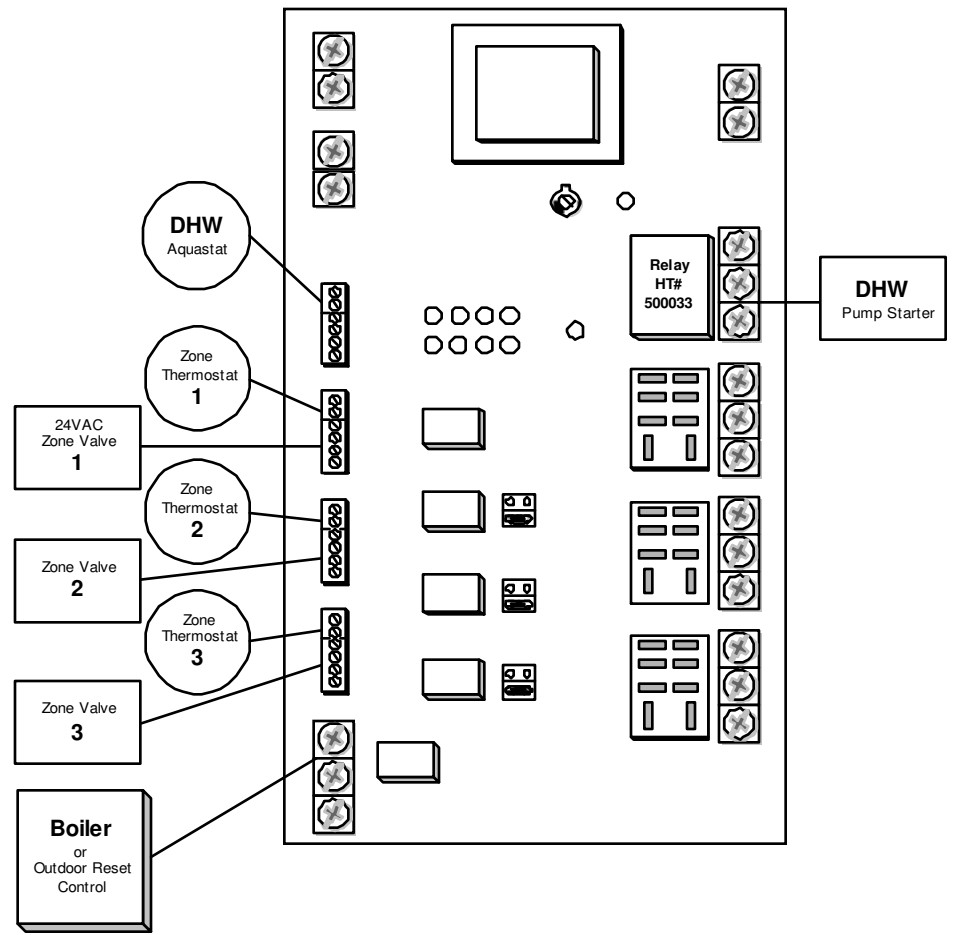
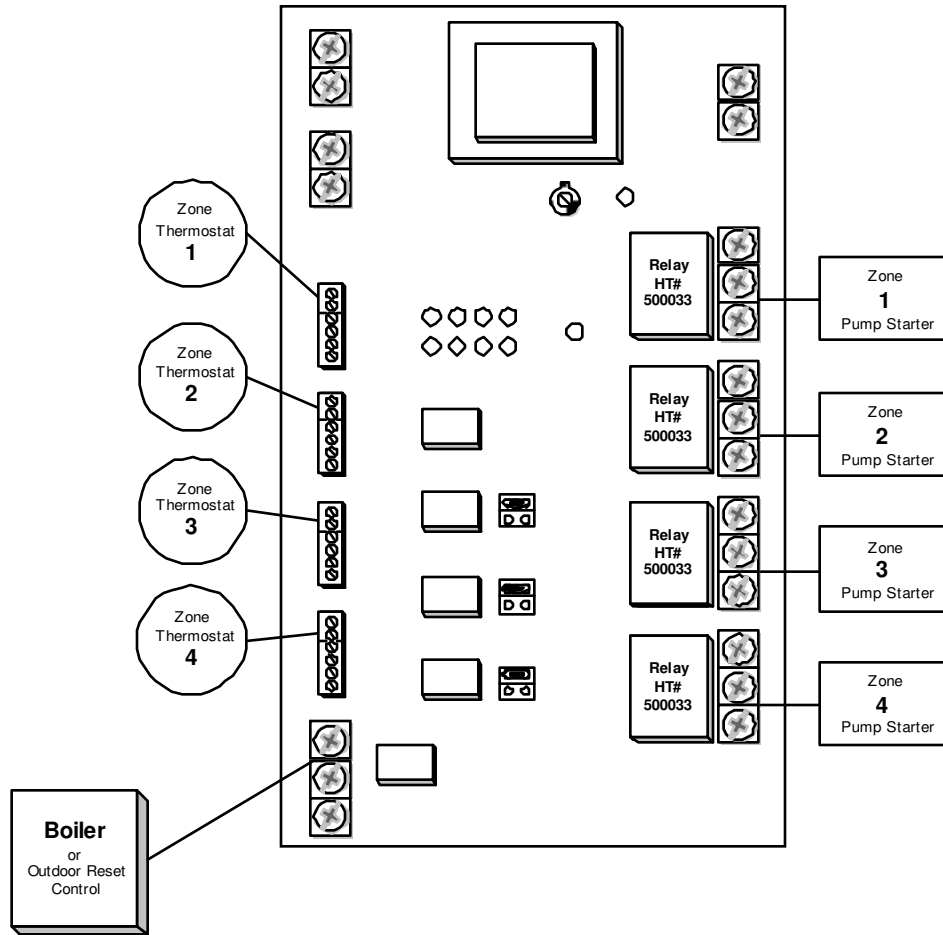


TYPICAL WIRING DIAGRAMS

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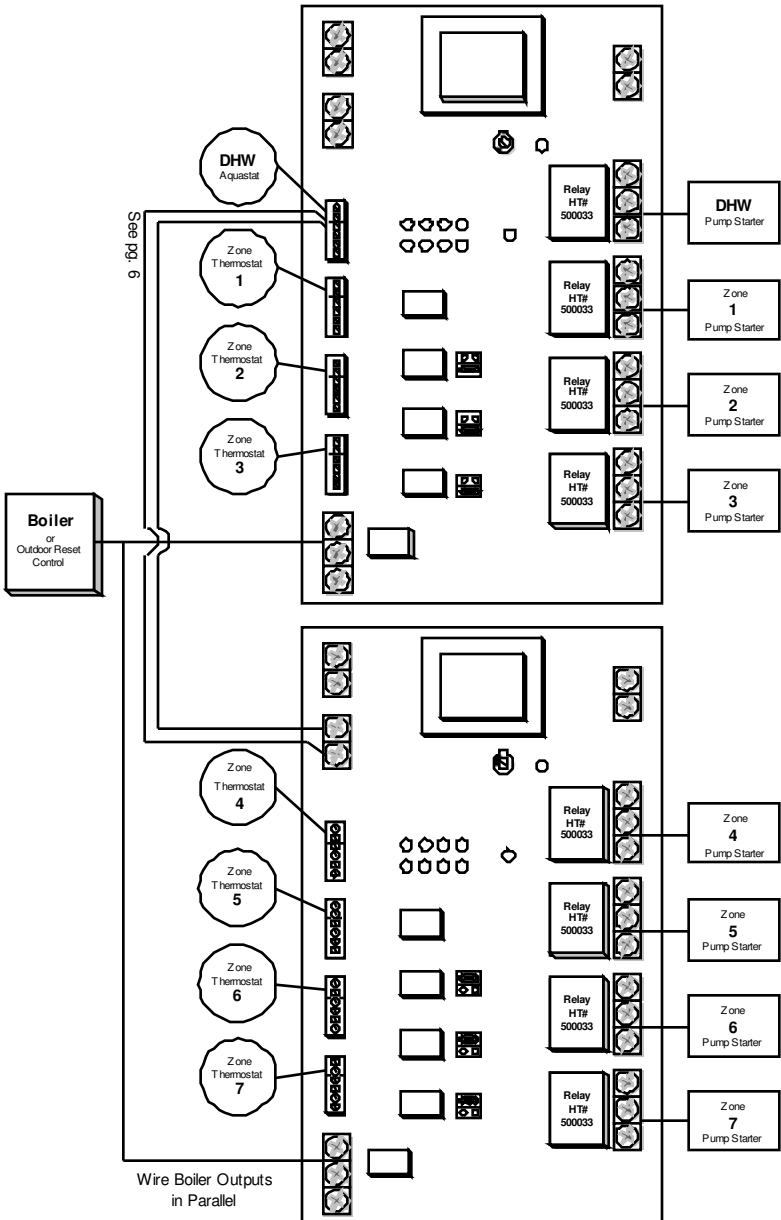
Up to 4-120V Heating Zone Pumps No DHW Priority

DHW 120V Pump Up to 3-24VAC Heating Zones

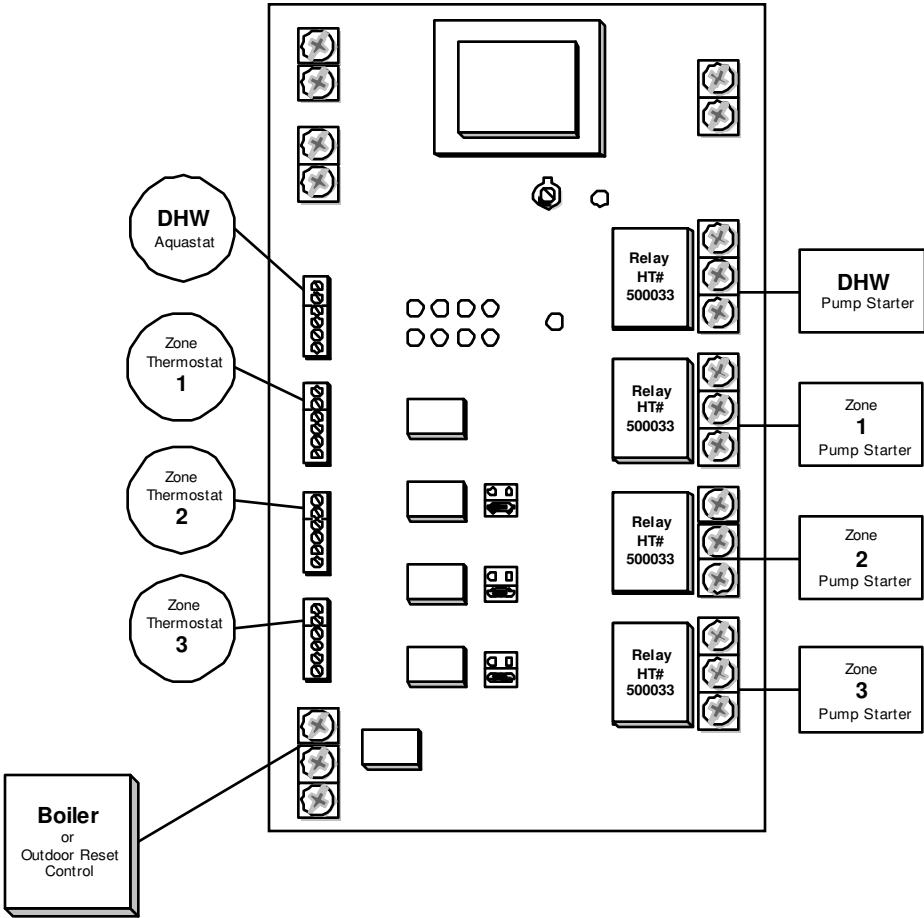


TYPICAL WIRING DIAGRAMS

DHW 120V Pump Up to 7-120V Heating Pumps



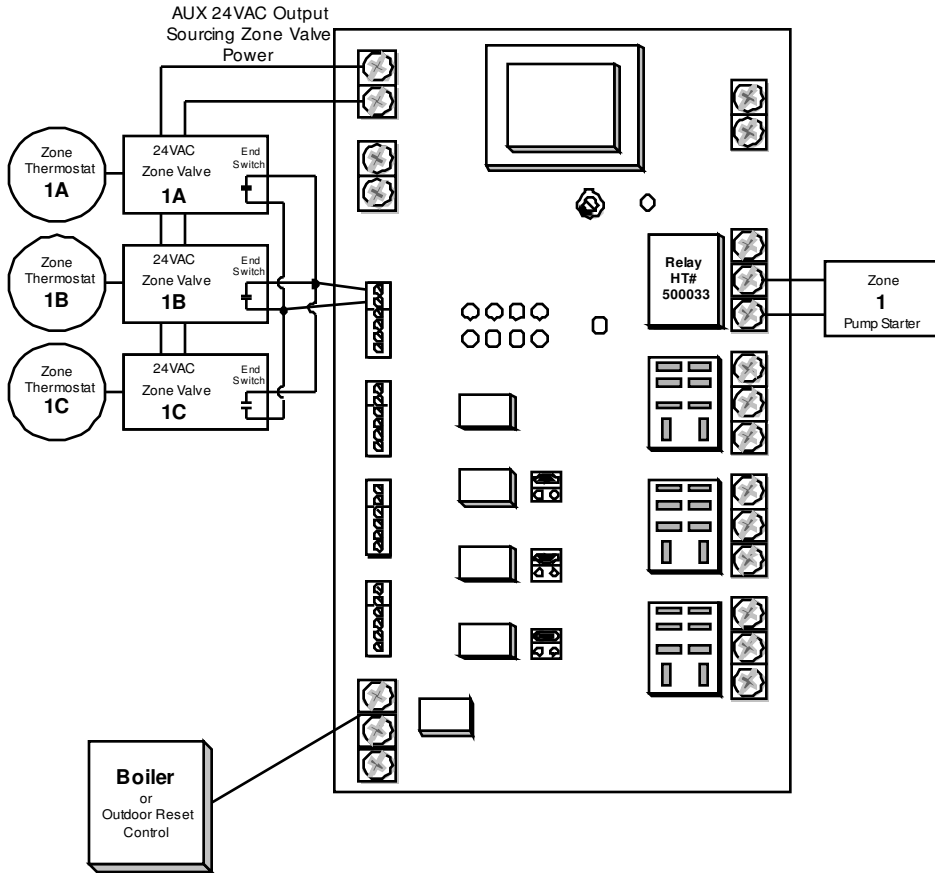
DHW 120V Pump Up to 3-120V Heating Pumps



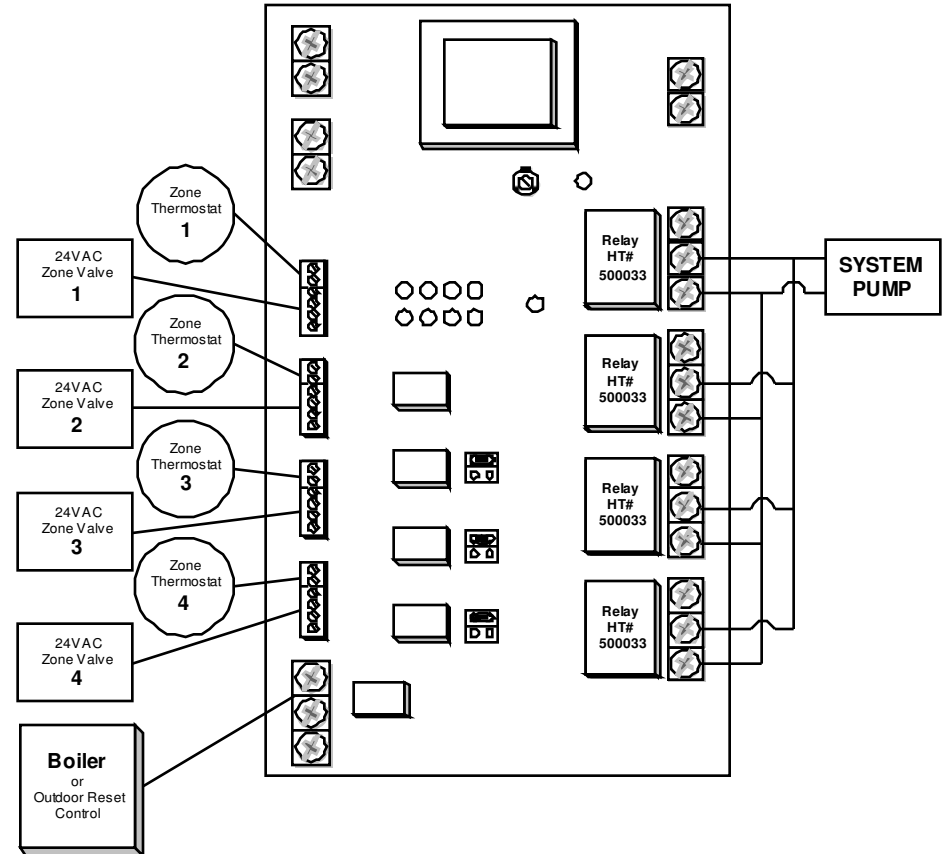
TYPICAL WIRING DIAGRAMS

13

Multiple Zone Valve to a Single Zone Pump (Typical per Pump)



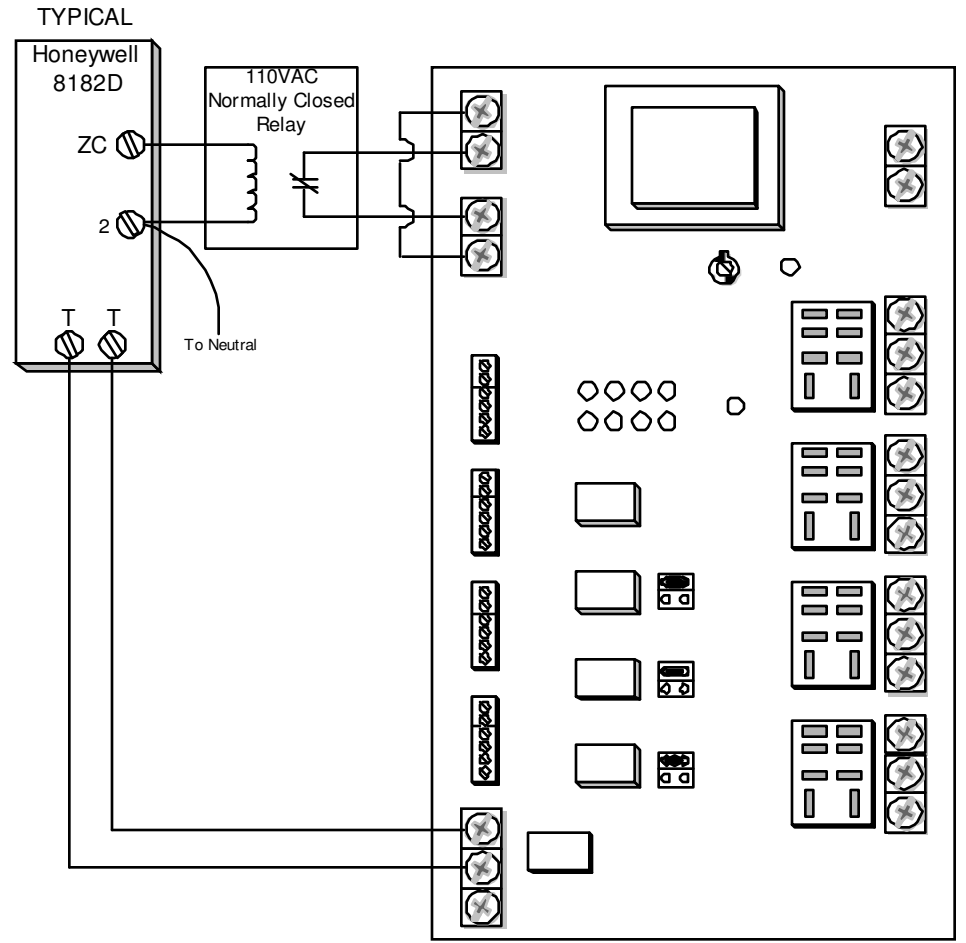
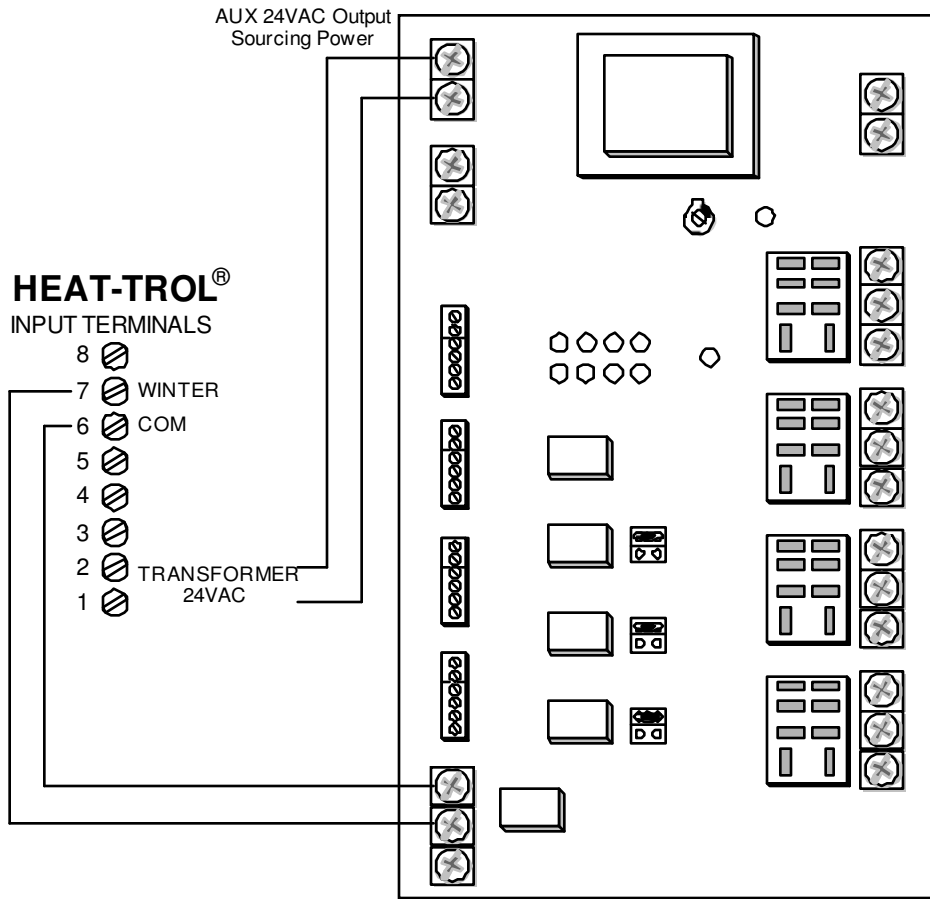
Multiple Zone Valves with Single System Pump



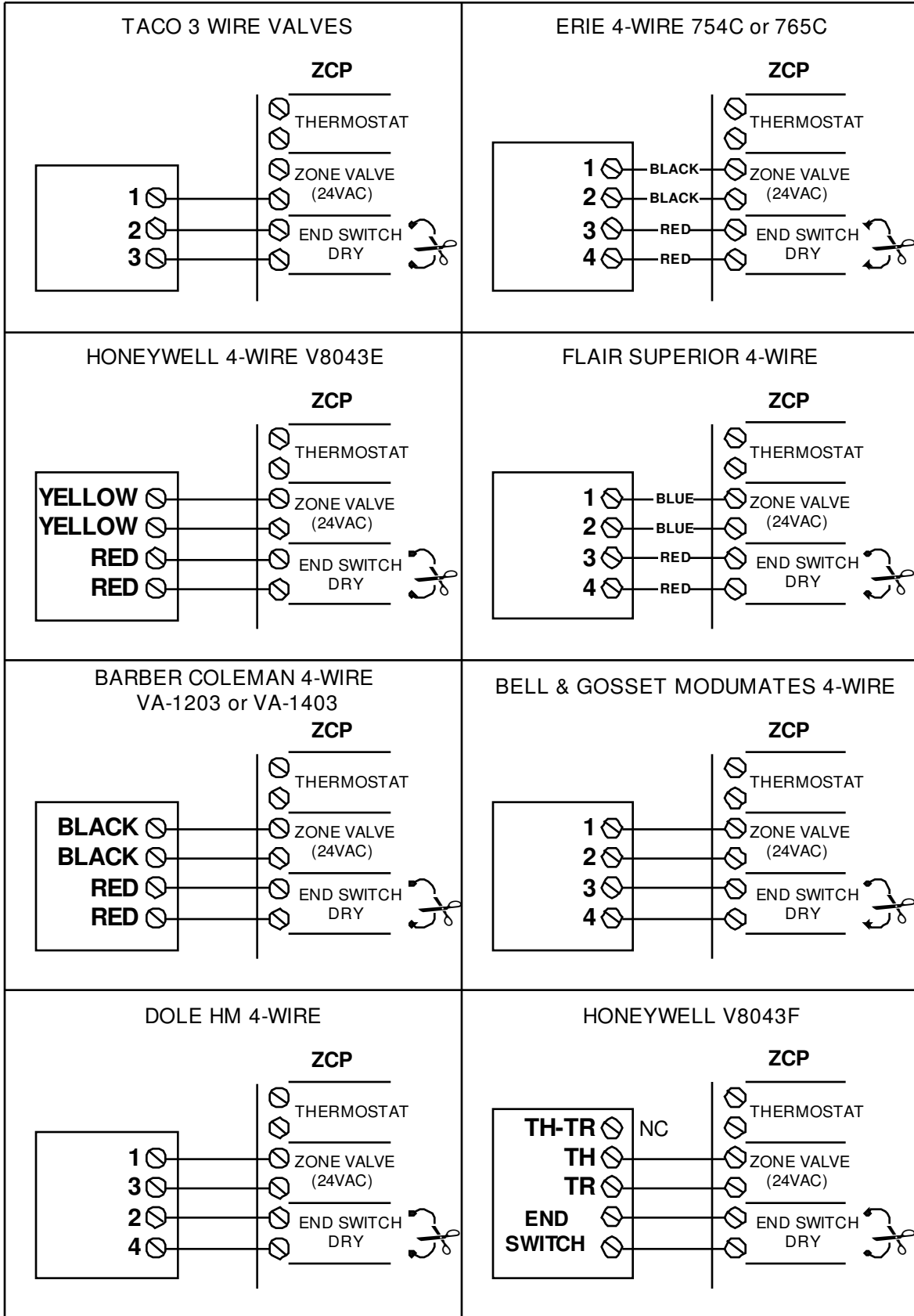
TYPICAL WIRING DIAGRAMS

ZCP Powering HEAT-TROL®

Boilers with ZC-ZR Contacts (Built-in DHW Priority)



STANDARD ZONE VALVE WIRING*



*Carefully check the valve manufacturer's wiring diagrams and instructions. If there is any question, or your valve does not appear above, call Heat-Timer before wiring. Wiring a valve incorrectly may damage the valve, or the ZCP.

LIMITED WARRANTY

Heat-Timer Corporation warrants that it will replace, or at its option, repair any products or part thereof which is found defective in material or workmanship within one year from the date of installation.

The foregoing is in lieu of all other warranties, express or implied, and Heat-Timer Corporation specifically disclaims any and all warranties of merchantability or fitness for a particular purpose.

Under no circumstances shall Heat-Timer Corporation, its authorized representatives, affiliated or subsidiary companies be liable for special, consequential or incidental damages. Except as specially stated in these terms and conditions of sale, the sole remedy with respect to any product or part sold or manufactured by Heat-Timer Corporation shall be limited to the right to replacement, or at Heat-Timer Corporations option, repair F.O.B., Fairfield, NJ.

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