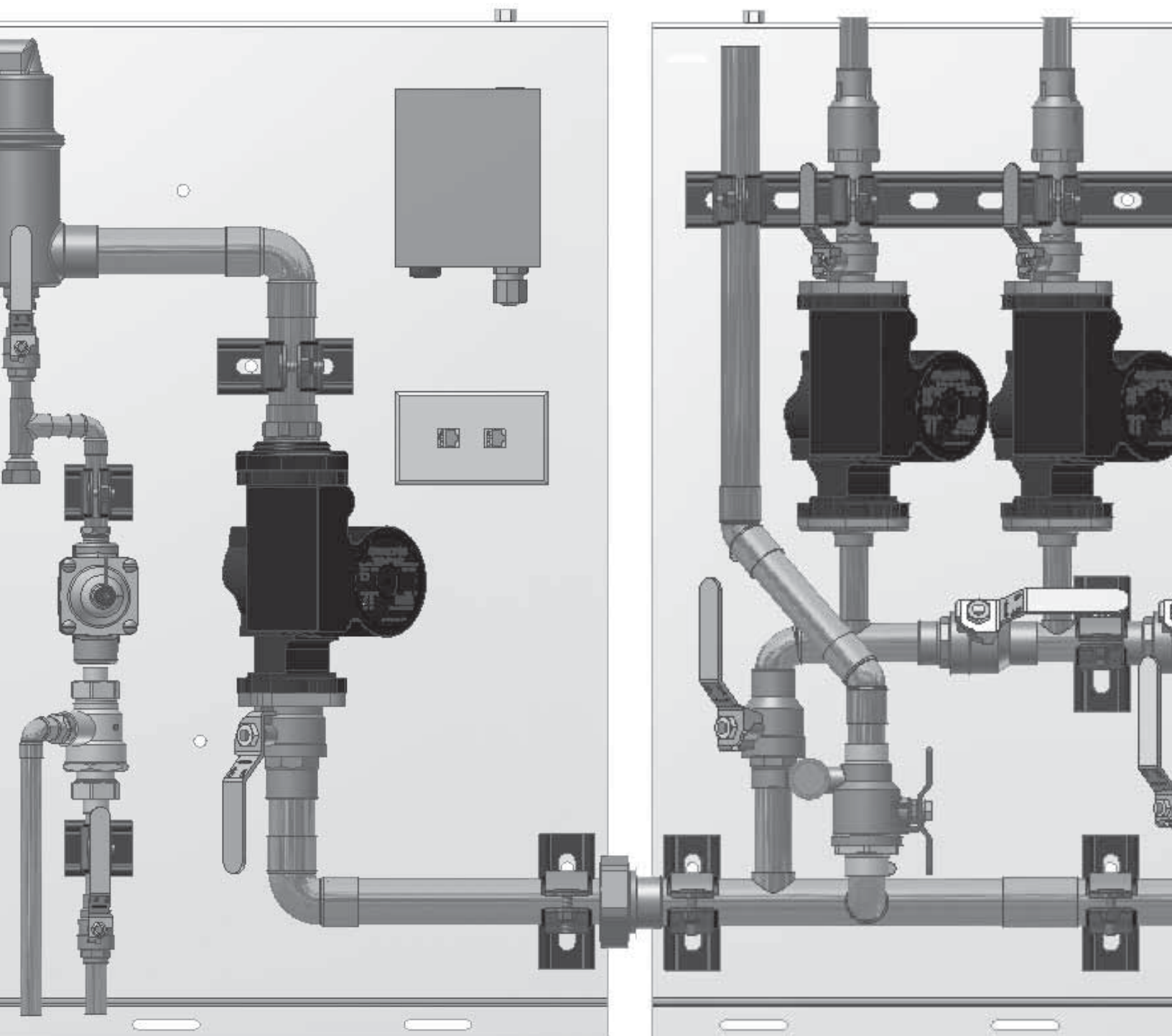


# **HydroNex<sup>®</sup>**

## Installation and Operations Manual





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## 1. Introduction

Congratulations on the choice to use Watts Radiant's HydroNex panels. These panels have been designed to make installation, operation and maintenance easier.

This manual contains various sections including component overview and proper operational procedures. If additional information is required, please contact the local Watts Radiant wholesaler or representative. Information may also be located at [www.wattsradiant.com](http://www.wattsradiant.com), or by calling 800.276.2419.

Some of the included illustrations may vary slightly from the actual panel layout and design. All necessary function and operation of the panels remain the same as indicated in this manual.

## 2. Receiving

Before unpacking the panel(s), check the HydroNex package for damage. Make sure there are no seriously crushed edges of the cover or surrounding supports. If damage is evident, report this to the shipping company. Contact Watts Radiant for assistance, if needed.

Damage can result in improper operation, both mechanically and electrically. Do not attempt to fix damaged areas without obtaining written instructions from Watts Radiant on how the corrections are to be performed.

## 3. Basic Installation Steps

### P and D Series Panels

1. Securely mount panel rails to the walls (see Section 7 and Appendix D for details)
2. Hang the HydroNex panel(s) on the rails. P Panels will always be to the left of D panels.
3. Arrange the D Panel(s) left to right from hottest to coolest water temperature required.
4. Tighten the union(s) between panel(s).
5. Field pipe to the expansion tank or use an Onix Expansion Tank Kit (ordered separately). The expansion tank is not included with the HydroNex panel (see Appendix C).
6. Field pipe to the auto-fill assembly if included.
7. Field pipe 1-1/4" copper from the heat source supply to the left side of the P Panel.
8. Field pipe 1-1/4" copper from the right side of the last D Panel to the heat source return.
9. If an indirect water heater is used, field pipe supply/return lines from the D Panel to the indirect water heater. The indirect is always the circulator furthest to the left on the D Direct, D VIP Hybrid, or DMix Hybrid panel.
10. Field pipe supplies and returns from D Panel(s) to Z Panel(s), radiant manifolds, and/or other hydronic equipment.
11. Run CAT-5 cables (supplied with each panel except Z Series) from connection on P Panel to D Panel and any subsequent D Panel(s) (see Section 6 for details).
12. Field wire thermostats to pump relay boxes on D Panel(s). Field wire aquastat for indirect water heater (if applicable) to Priority Zone on relay box of appropriate D Panel (see Section 5 for details).
13. Field wire from T-T on boiler to TT on pump relay on P Panel (see Section 6 for details).
14. Plug in the power cord of each panel to a grounded electrical outlet.

### Z Series Panels

1. Mount Z Panel enclosure in wall (see Section 7 for details). Be sure to leave room for piping and electrical connections.
2. Field pipe distribution piping to and from mechanical room to Z Panel.
3. Connect radiant tubing to manifold.
4. If Z Panel has actuators, field wire thermostats to actuator control in Z Panel (see Section 7 and Appendix B for details).
5. Bring 120 V power to the electrical box on the Z Panel.

## 4. Component Descriptions, Operation and Start-up

The HydroNex system is made up of three types of panels. P (Primary) Series control circulation through the boiler or dedicated heat source. D (Direct) Series serve as distribution panels to terminal units such as baseboard, fan coils or indirect water heaters. Z (Zone) Series panels serve as zone-specific distribution panels.

HydroNex panels are designed around primary/secondary piping fundamentals. All panel options are available with Bell and Gossett, Taco or Watts Radiant (Grundfos) circulators. Controls are limited to relay connections, except on the injection panels where a Tekmar control is used and on the P Series where an optional 256 reset control can be used.

Z Series panels contain zone valve controls and may be equipped with individual circuit actuators and a Watts Radiant circulator.

Standard thermostats may be used with all controls and/or relay connections.

Upon receipt of a HydroNex panel, verify no damage has occurred during shipping. If damage is evident, contact the shipper.

### Accessory Items:

Even though the HydroNex panel system is an easy, ready to install mechanical system, it is not a complete system by itself. Some of the accessory items that may still be required, depending on panel selection, include the following:

1. Heat source
2. Expansion tank\*
3. System chemicals, such as glycol or corrosion proofers
4. Thermostats\*

\*Some of these items can be found in the main Watts Radiant product catalog.

Expansion Tank sizing can be found in the appendix of this manual.

### NOTE:

It is necessary to field pipe the system return piping in accordance to the boiler or heat source manufacturer. Return piping is not part of the HydroNex system.

## P Series Panels

Not all HydroNex components are necessary for every hydronic project. Choose the HydroNex panel based on the following:

1. Boiler/heat source requirements
2. Control needs (reset options)
3. Number of high temp zones
4. Number of low temp zones
5. Variance in supply fluid temperatures

The maximum flow rate for a HydroNex panel is 13 gpm (gallons per minute). This equates to approximately 140 MBH for water based systems and 126 MBH for glycol based systems.

The maximum flow rate for each 3/4" zone is 4 gpm.

### NOTE:

Higher loads and flow rates may be possible but should only be attempted by advanced radiant installers who understand the dynamics between the heat source, pipe sizes, circulators and flow requirements of the radiant system.

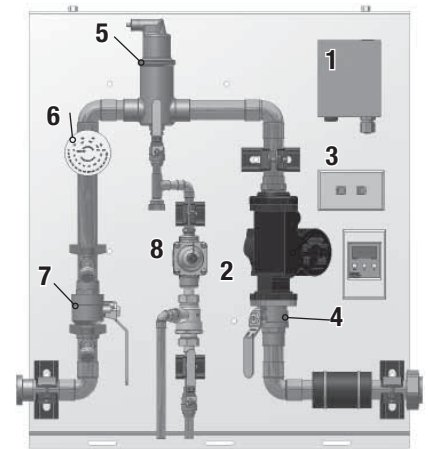
P Series Panels are primary panels designed to circulate water through boilers, not through the radiant or other hydronic heating zones. They also remove air and provide essential service and monitoring capabilities. They are available with or without outdoor boiler reset controls and auto-fill assemblies.

D Series and P Series panels include only the supply portion of the primary loop. The return portion of this loop must always be field piped in 1-1/4" copper back to the boiler or dedicated heat source.

All P Series panels are designed to connect directly to any D Series panel via the included union. Control logic is transferred from the D Series panels to the P Panel via the included CAT5 cable connection.

(Note: Special Series panels may or may not integrate directly with a P-Series panel.)

Optional accessories include auto-fill assembly (shown) and a boiler reset module. Reset should not be used if using an injection D Series panel as these already contain a reset feature on the included Tekmar 361.



### P Panel

- |                     |                               |
|---------------------|-------------------------------|
| 1. Relay Box        | 5. Air Remover                |
| 2. Circulator       | 6. Temperature/Pressure Gauge |
| 3. CAT-5            | 7. Manual Fill Assembly       |
| 4. Isolation Flange | 8. Auto Fill Assembly         |

## D Series Panels

D Series Panels are secondary distribution panels designed to send water to terminal units, such as indirect water heaters, fan coils, baseboard units or radiant manifolds. Each D Series panel is available in 1 to 5 zone configurations and include the following:

### DDirect (1- 5 zones):

Direct panels are designed to feed high temperature zones, such as indirect water heaters, baseboards or fan coil units. All supply and return lines are 1".

Under certain conditions, such as with the use of a condensing boiler, Direct panels can be connected directly to the heat source, if such piping arrangements are approved by the boiler manufacturer and provided the following conditions apply:

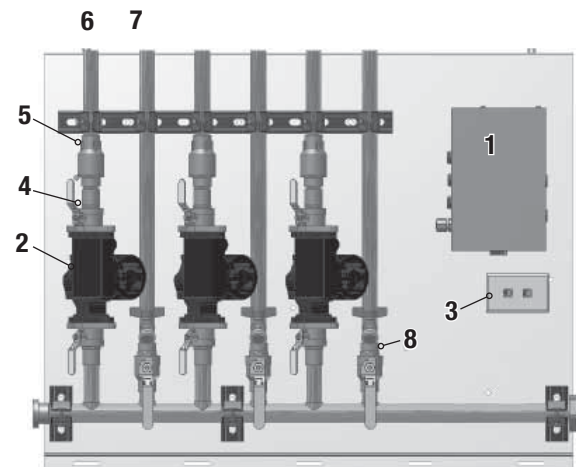
- Proper flow is maintained through the heat source.
- Heat source can be set to desired temperature setting (no mixing required).
- No minimum return fluid temperature is required for the heat source.
- All necessary conditions and piping practices, as outlined by the heat source manufacturer, are properly maintained.

### Purging

To purge a Direct panel, close all isolation ball valves (4) located on each circulator. Open the isolation ball valve for the first zone. Close the corresponding purge valve (8) and open the drain port. Make sure the Primary Panel is connected to and water is delivered from either the auto-fill or manual fill assembly. When the first zone is filled and purged, close all valves for that zone and repeat for the next zone. Repeat until all zones are filled and purged. Open the purge ball valve and cap the drain. Make sure all isolation ball valves are open for normal operation.

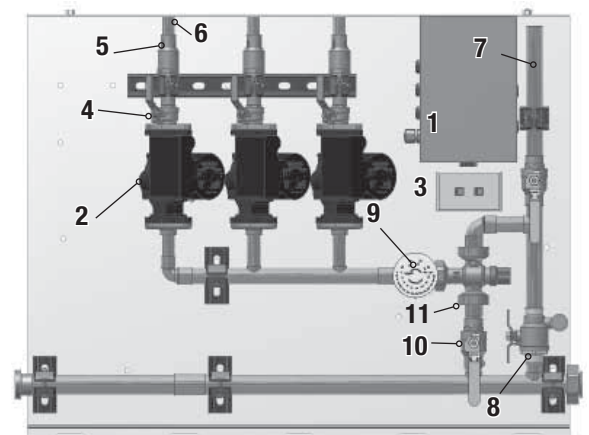
### DMix (1-3 zones):

Mix panels utilize a 1" mix valve (Cv = 3.2) to provide basic mixing for radiant systems. Each supply line is 3/4". All supplies share a common 1" return.



### D Direct

- |                     |                     |
|---------------------|---------------------|
| 1. Relay Box        | 5. Check Valve      |
| 2. Circulator       | 6. Supply (1")      |
| 3. CAT-5            | 7. Return (1")      |
| 4. Isolation Flange | 8. Purge/Ball Valve |



### DMix

- |                     |                          |
|---------------------|--------------------------|
| 1. Relay Box        | 6. Supply (3/4")         |
| 2. Circulator       | 7. Return (1")           |
| 3. CAT-5            | 8. Purge/Ball Valve      |
| 4. Isolation Flange | 9. Press/Temp Gauge      |
| 5. Check Valve      | 10. Full Port Ball Valve |
|                     | 11. Mix Valve            |

### Caution:

If installing DPanels as well as ZPanels, do not install ZPanels with circulators.

When selecting a mix valve panel, the following guidelines should be followed:

- Make sure all zones fall within a 20 degree required temperature range. (i.e. 104, 114, 120 supply temperature requirements can be grouped from a single mix valve).
- Make sure the combined flow rates of the selected zones do not exceed 3.2 gpm, the Cv rating of the mix valve. (i.e. 1, 2, 3 gpm combined flows can be used from a single mix valve panel. Higher values will result in increased head pressure conditions.)

### Purging

To purge a mix valve panel, first close the purge ball valve (8) and open the drain port. This causes the water to go through the zones instead of the by-pass. Close all circulator isolation ball valves (4). Open the first zone isolation ball valve. Make sure the Primary Panel is connected to and water is delivered from either the auto-fill or manual fill assembly. When the first zone is filled and purged, close all valves for that zone and open the next zone isolation ball valve. Repeat until all zones are filled and purged. Open the purge ball valve and cap the drain. Make sure all isolation ball valves are open for normal operation.

**Note: the by-pass valve should only be closed during purging and should remain in the full-open position for normal operation.**

### DVIP (1-5 zones):

DVIP panels use injection reset mixing to modulate the supply fluid temperature to the radiant zones. The injection bridge is 3/4" in size for all DVIP panels. All zones are 3/4" supply with a common 1" return.

A Tekmar 361 is provided to control the injection circulator.

When selecting a VIP panel, the following guidelines should be followed:

- Make sure all zones fall within a 20 degree required temperature range. (i.e. 110, 114, 125 supply temperature requirements can be grouped from a single injection circulator).
- Make sure combined zone gpm can not exceed 13 gpm. Higher flow rates may result in improper operation.

### Purging

To purge a VIP panel, first close the purge ball valve (8). This causes the water to go through the zones instead of the by-pass. Close all circulator isolation ball valves (4). Open the first zone isolation ball valve. Make sure the Primary Panel is connected to and water is delivered from either the auto-fill or manual fill assembly. When the first zone is filled and purged, close all valves for that zone and open the next zone isolation ball valve. Repeat until all zones are filled and purged. Open the purge ball valve and cap the drain. Make sure all isolation ball valves are open for normal operation.

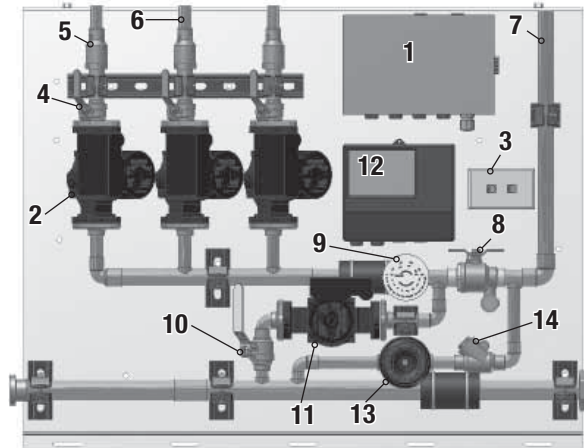
**Note: isolation, ball and purge valves should only be closed during purging and should remain in the full-open position for normal operation.**

### DHybrid Panels

Hybrid panels incorporate both high temperature (domestic hot water, baseboard or fan coils) and mix temperature zones, allowing the contractor to field-select how many zones are fed by zone pumps with no water temperature mixing and how many are fed by either mix valve-fed pumps or variable-speed injection-fed pumps. This design simplifies the number of panels required for a given project. Hybrid panels are available in 2-5 zone configurations.

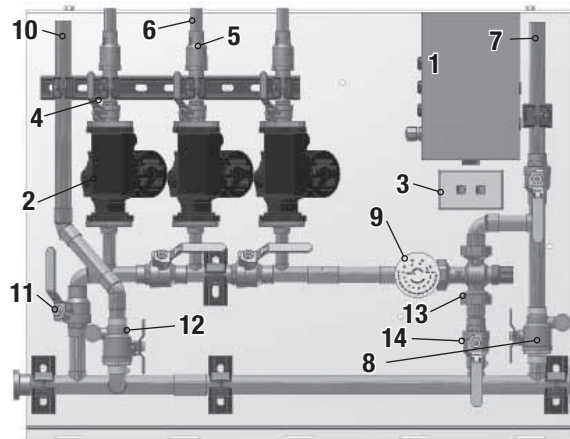
### DMixHybrid (2-4 zones):

Hybrid mix panels utilize a 1" mix valve (Cv = 3.2) to provide basic mixing for radiant systems. Each supply line is 3/4". All supplies share a common 1" return.



#### DVIP

- |                     |                                  |
|---------------------|----------------------------------|
| 1. Relay Box        | 8. Purge/Ball Valve              |
| 2. Circulator       | 9. Press/Temp Gauge              |
| 3. CAT-5            | 10. Full Port Ball Valve         |
| 4. Isolation Flange | 11. Injection Circulator         |
| 5. Check Valve      | 12. Tekmar 361 Injection Control |
| 6. Supply (3/4")    | 13. Gate Valve                   |
| 7. Return (1")      | 14. Swing Check Valve            |



#### DMix Hybrid

- |                     |                           |
|---------------------|---------------------------|
| 1. Relay Box        | 8. Purge/Ball Valve       |
| 2. Circulator       | 9. Press/Temp Gauge       |
| 3. CAT-5            | 10. High Temp Return (1") |
| 4. Isolation Flange | 11. Full Port Ball Valve  |
| 5. Check Valve      | 12. High Temp Purge Valve |
| 6. Supply (3/4")    | 13. Mix Valve             |
| 7. Return (1")      | 14. Full Port Ball Valve  |

When considering the total BTU capacity of a HydroNex panel, one has to consider the necessary flow requirements (if any) for the given heat source. Some heat sources, such as condensing boilers and copper fin-tube boilers, have a minimum flow requirement. When a minimum flow requirement is present, it may not be feasible to go to a larger Delta T.

Consult boiler manufacturer's literature for further information on boiler capacities.

Specific control information can be found in the packet that accompanies the HydroNex panels. Please refer to these documents for further information on control operation.

The first (left-most) zone on the panel may be used for an indirect water heater and is wired accordingly with Domestic Hot Water (DHW) priority. If this zone feeds an indirect DHW unit, the priority switch will need to be turned on in the relay box (see electrical schematics at the end of this manual for further details) and the Master/Slave switch set to Master. **All HydroNex panels are shipped with the Priority switch set to OFF.**

To utilize the high temperature zone feature on the hybrid panel, close the ball valve between the first zone and second zone circulator. This will allow only high temperature water, fed directly from the main trunk, to flow into the first zone. If there are two high temperature zones (a DHW system and a baseboard unit, for example), close the ball valve between the second and third circulator. The remaining circulator(s) are then fed from the mix valve.

When selecting a Hybrid Mix Valve panel, the following guidelines should be followed:

- Make sure the zones feeding from the mix valve fall within a 20 degree required temperature range. (i.e. 110, 114, 118 supply temperature requirements can be grouped from a single valve).
- Make sure the combined flow rates of the mix valve zones does not exceed 3.2 gpm, the allowable Cv rating of the mix valve. Higher values will result in improper operation.

### Purging

To purge a Hybrid Mix Valve Panel, first close the purge ball valve (8) and open the drain port. If there are no high temperature zones, such as DHW or baseboard, close the ball valve (11) on the high temperature feed. This causes the water to go through the zones instead of the by-pass and the panel will purge in the same manner as a standard D Mix panel. If high temperature zones are present, close the isolation ball valve between the last high temperature zone and the first radiant zone and close the purge ball valve (12) on the high temperature return and open the corresponding drain. This allows for more thorough purging of the high temperature zones. Close all circulator isolation ball valves (4). Open the first zone isolation ball valve. Make sure the Primary Panel is connected to and water is delivered from either the auto-fill or manual fill assembly. When the first zone is filled and purged, close all valves for that zone and open the next zone isolation ball valve. Repeat until all zones are filled and purged. Open all purge ball valves and cap the drain. Make sure all isolation ball valves are open for normal operation.

### DVIPHybrid (2-5 zones):

Hybrid VIP panels use injection reset mixing to modulate the supply fluid temperature to the radiant zones. The injection bridge is 3/4" in size for all DVIP panels. All zones are 3/4" supply with a common 1" return.

A Tekmar 361 is provided to control the injection circulator.

**Note: The Warm Weather Shut Down (WWSD) must be turned "off" when using the priority zone for domestic hot water. Failure to do so will prevent the indirect water heater from working properly during summer months.**

The first (left-most) zone on the panel may be used for an indirect water heater and is wired accordingly with Domestic Hot Water priority. If this zone feeds an indirect DHW unit, the priority switch will need to be turned on in the relay box (see electrical schematics at the end of this manual for further details) and the Master/Slave switch set to Master.

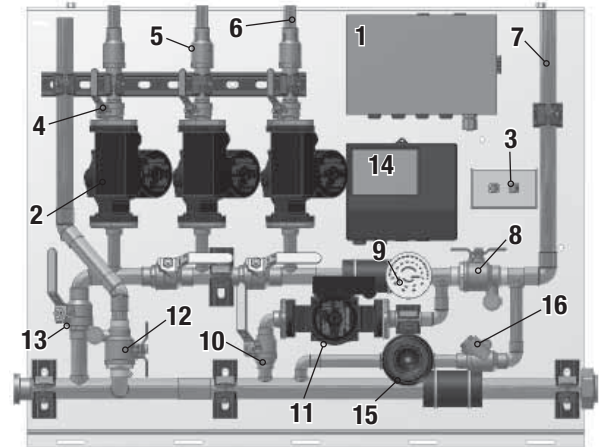
To utilize the high temperature zone feature on the hybrid panel, close the ball valve between the first zone and second zone circulator. This will allow only high temperature water, fed directly from the main trunk, to flow into the first zone. If there are two high temperature zones (a DHW system and a baseboard unit, for example), close the ball valve between the second and third circulator. The remaining circulator(s) are then fed from the injection circulator.

When selecting a Hybrid VIP Panel, the following guidelines should be followed:

- Make sure all zones feeding from the injection circulator fall within a 20 degree required temperature range. (i.e. 110, 114, 125 supply temperature requirements can be grouped from a single injection circulator).
- Make sure the combined zone gpm can not exceed 20 gpm. Higher flow rates may result in improper operation.

### Purging

To purge a Hybrid VIP panel, first close the purge ball valve (8) and open the drain port. If there are no high temperature zones, such as DHW or baseboard, close the ball valve (13) on the high temperature feed. This causes the water to go through the zones instead of the by-pass and the panel will purge in the same manner as a standard DVIP panel. If high temperature zones are present, close the isolation ball valve between the last high temperature zone and the first radiant zone and close the purge ball valve (12) on the high temperature return and open the corresponding drain. This allows for more thorough purging of the high temperature zones. Close all circulator isolation ball valves (4). Open the first zone isolation ball valve. Make sure the Primary



### DVIP Hybrid

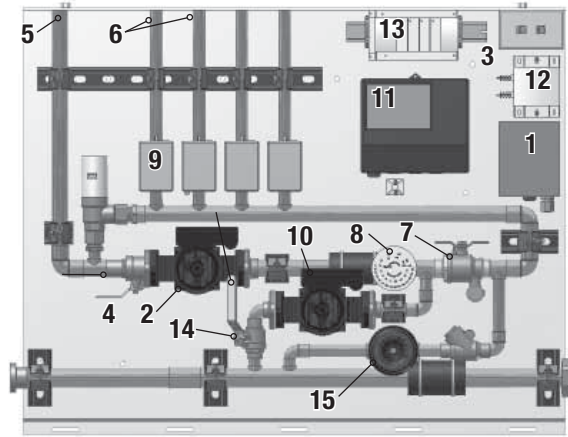
- |                     |                                  |
|---------------------|----------------------------------|
| 1. Relay Box        | 9. Press/Temp Gauge              |
| 2. Circulator       | 10. Full Port Ball Valve         |
| 3. CAT-5            | 11. Injection Circulator         |
| 4. Isolation Flange | 12. High Temp Purge Valve        |
| 5. Check Valve      | 13. Full Port Ball Valve         |
| 6. Supply (3/4")    | 14. Tekmar 361 Injection Control |
| 7. Return (1")      | 15. Gate Valve                   |
| 8. Purge/Ball Valve | 16. Swing Check Valve            |

Panel is connected to and water is delivered from either the auto-fill or manual fill assembly. When the first zone is filled and purged, close all valves for that zone and open the next zone isolation ball valve. Repeat until all zones are filled and purged. Open all purge ball valves and cap the drain. Make sure all isolation ball valves are open for normal operation.

Although additional controls are available from various control manufacturers, such as Tekmar, the HydroNex panels are set up to function only with those controls listed in this manual. If different or additional controls are required, please contact Watts Radiant for a custom HydroControl panel design.

### Zone Valve DVIP Panel

A Zone Valve DVIP Panel is designed to use the same mixing control logic as a standard DVIP panel with only a single supply circulator. Each zone is equipped with zone valve actuators on each return line. See DVIP section for more set up details.

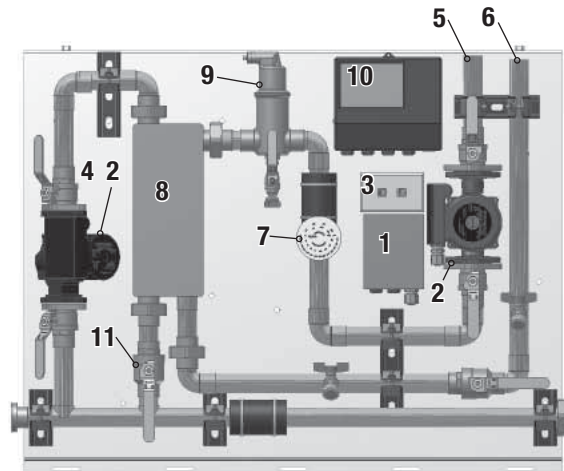


### DVIP Zone Valve Panel

- |                     |                                  |
|---------------------|----------------------------------|
| 1. Relay Box        | 8. Press/Temp Gauge              |
| 2. Circulator       | 9. Zone Valve                    |
| 3. CAT-5            | 10. Injection Circulator         |
| 4. Isolation Flange | 11. Tekmar 361 Injection Control |
| 5. Supply (1-1/4")  | 12. Transformer                  |
| 6. Return (3/4")    | 13. Zone Valve Relay Box         |
| 7. Purge/Ball Valve | 14. Full Port Ball Valve         |
|                     | 15. Gate Valve                   |

### Heat Exchanger Panel

A Heat Exchanger panel is designed to provide system isolation to a select area. In most cases this is due to glycol being used, such as with a snowmelt application. Each HX (heat exchanger) panel can be ordered with either a Tekmar 361 control for heating or a Tekmar 665 for snowmelt.



### Heat Exchanger Panel

- |                     |                                 |
|---------------------|---------------------------------|
| 1. Relay Box        | 7. Press/Temp Gauge             |
| 2. Circulator       | 8. Heat Exchanger               |
| 3. CAT-5            | 9. Air Vent                     |
| 4. Isolation Flange | 10. Tekmar Control (361 or 665) |
| 5. Supply (1-1/4")  | 11. Full Port Ball Valve        |
| 6. Return (1-1/4")  |                                 |



### GeoThermal (1-3 Units):

A GeoThermal panel is designed to connect before a P-Panel. Each GeoThermal panel controls heat load relative to the main thermal storage tank(s). Thermal storage tank(s) are used to help prevent short cycling of GeoThermal unit(s).

Back up heat sources can be integrated into the control logic from the P-Panel if necessary.

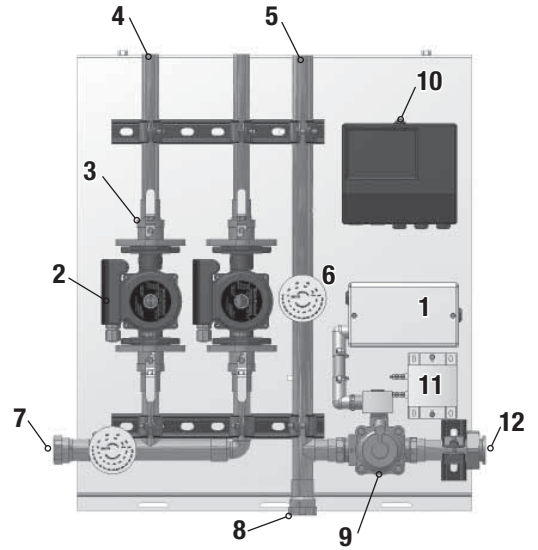
Control options include one of the following:

1. Tekmar 256 with a GEO 1 panel.
2. Tekmar 264 with a GEO 2 or GEO 3 panel.

### Purging

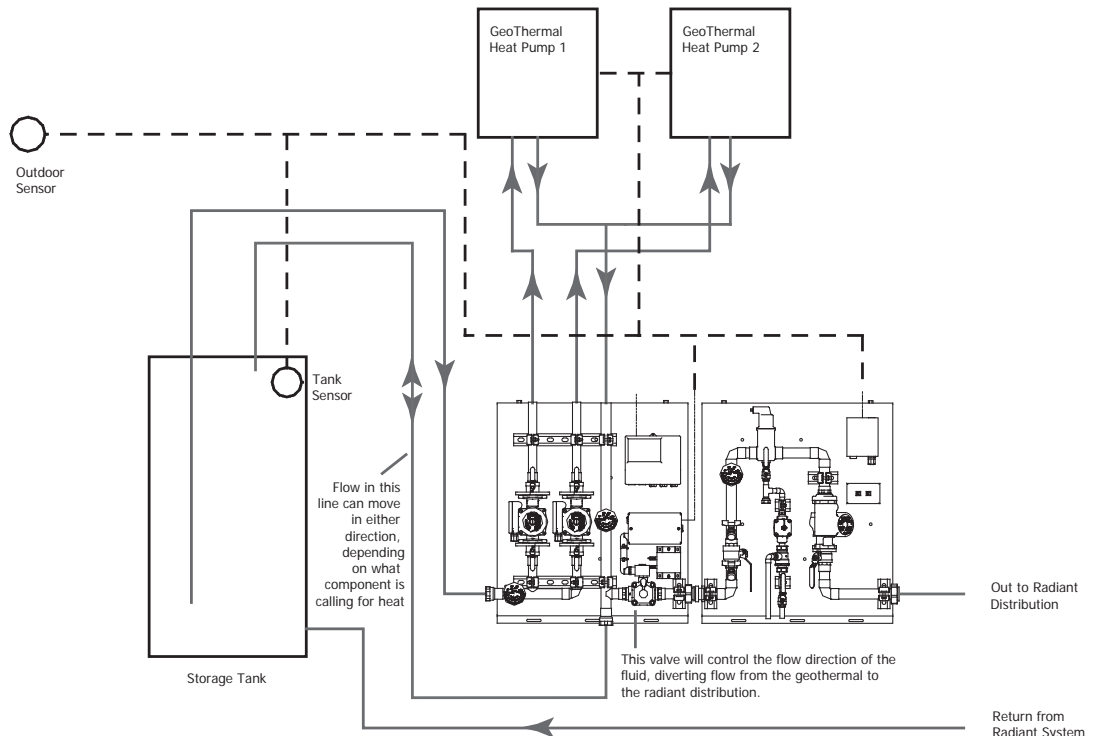
To purge a GeoThermal panel, first close the manual fill valve on the P-Panel (not shown) and close one of the isolation ball valve(s) (3) on the GeoThermal panel. This will allow only fluid flow through the main geothermal supply line and the storage tank(s). Once this is purged, open the isolation ball valves (3) and open the fill valve (P-Panel).

Proceed with purging the remaining HydroNex panels as described in the previous sections.



### GeoThermal Panel

- |                                    |                                 |
|------------------------------------|---------------------------------|
| 1. Relay Box                       | 7. From Thermal Storage Tank(s) |
| 2. Circulator                      | 8. To Thermal Storage Tank(s)   |
| 3. Isolation Flange                | 9. Motorized Flow Control Valve |
| 4. Supply (1") to GeoThermal       | 10. Tekmar Control              |
| 5. Return (1-1/4") from GeoThermal | 11. Transformer                 |
| 6. Press/Temp Gauge                | 12. To Radiant (P-Series Panel) |



## ZPanel Series

Z Series panels are zone specific distribution panels. These panels include stainless steel manifolds to distribute water to radiant circuits, baseboard or other single temperature hydronic equipment. Z Panels are supplied with or without zone pumps, water temperature mixing, and/or zone actuators. All Z Series panels come pre-installed in a wall enclosure with an access cover. Z Series panels are available in 2-12 circuit configurations.

If actuators are selected, a factory wired zone valve control will be provided with the panel.

When selecting a ZZone panel, the following guidelines should be followed:

- Make sure the combined flow of the total number of circuits does not exceed 12 gpm (the maximum capacity of the manifold).
- If actuators are selected, it is recommended the following items be used:
  - a manifold differential by-pass valve to provide proper flow conditions.
  - Individual circuit ball valves to allow the internal balance valve, located on the return manifold, to be used to balance the overall flow through the circuit, leaving the circuit ball valve for isolation and purging. Individual circuit isolation valves are ordered separately and do not come with the panel.

### Purging

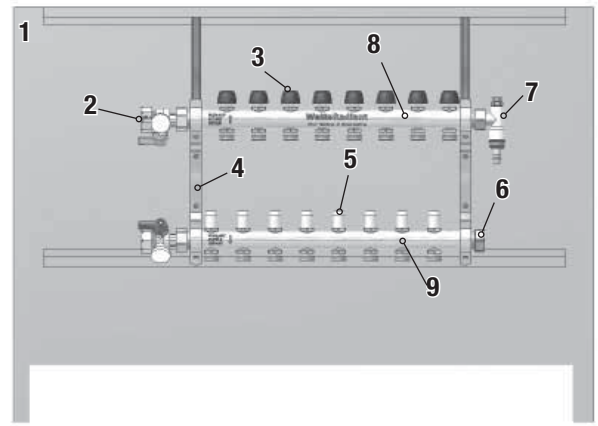
To purge a ZZone panel, close the pressure by-pass valves (if one is present) and all circuit valves. This forces the water to go through the zones instead of the by-pass. Close all isolation ball valves located on each circuit. Open the first circuit isolation ball valve. Open the purge valve at the end of the manifold. When the first zone is filled and purged, close that zone and open the next zone. Repeat until all zones are filled and purged.

Under flow conditions, with all circuits open, open the by-pass valve until flow is detected across the valve. Stop and close the valve 1/4 turn. Additional information on setting the by-pass valve can be found in the Accessories section.

Although the main concept behind the HydroNex mounting system is to allow a single person to mount a HydroNex panel, larger panels may require two people. Refer to the table in this manual for further information on estimated panel weights.

### ZZone Panel (2-12 circuits):

ZZone panels are basic manifold distribution panels. Individual circuit actuators are an option, allowing for zone control of each circuit. ZZone panels require a circulator to function properly. This can be field installed or may be part of a standard D Series panel.



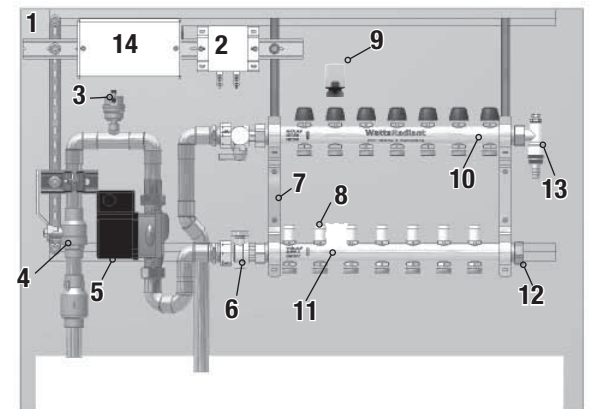
#### ZZone Panel

- |                                                 |                        |
|-------------------------------------------------|------------------------|
| 1. Manifold Box                                 | 5. Flow Meter          |
| 2. Trunk Isolation Valve with Temperature Gauge | 6. End Cap             |
| 3. Internal Balance Valve                       | 7. Vent/Purge Assembly |
| 4. Manifold Bracket                             | 8. Return Manifold     |
|                                                 | 9. Supply Manifold     |

### ZPumpZone Panel (2-8 circuits):

ZPumpZone panels are basic manifold distribution panels with their own circulator. Individual circuit actuators are an option, allowing for zone control of each circuit. Connecting a ZPumpZone Panel to any D Series or directly to a P Series panel is not recommended, as this will place two circulators in series and may result in over pumping of the manifold.

**Note: the exception to this is if the Z Panel is to be placed at an extremely long distance from the main mechanical room. This will place two circulators in series, allowing for additional head capacity. This should only be done by a radiant professional who is familiar with this type of circulator set up.**

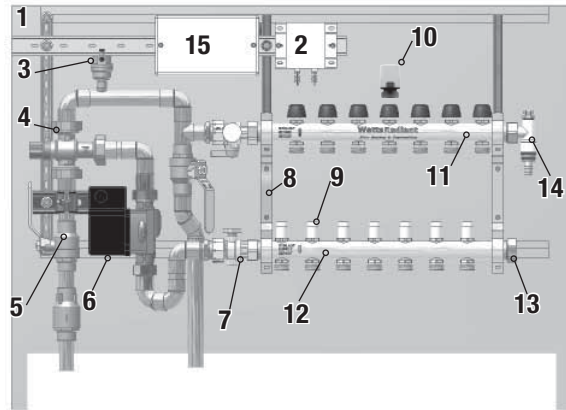


#### ZPumpZone Panel

- |                                                      |                                                          |
|------------------------------------------------------|----------------------------------------------------------|
| 1. Manifold Box                                      | 8. Flow Meter                                            |
| 2. Transformer                                       | 9. Thermal Actuator (attached to internal balance valve) |
| 3. Manual Air Vent                                   | 10. Return Manifold                                      |
| 4. Isolation Ball Valve                              | 11. Supply Manifold                                      |
| 5. Circulator                                        | 12. End Cap                                              |
| 6. Trunk Isolation Ball Valve with Temperature Gauge | 13. Vent/Purge Assembly                                  |
| 7. Manifold Bracket                                  | 14. Valve Control Box                                    |

### ZMixPumpZone Panel (2-7 circuits):

ZMixPumpZone panels are an all encompassing, single point manifold distribution panels with their own circulator and mixing valve. Individual circuit actuators are an option, allowing for zone control of each circuit. Connecting a ZMixPumpZone Panel to any D Series or directly to a P Series panel is not recommended, as this will place two circulators in series and may result in over pumping of the manifold.



#### ZMixPumpZone Panel

- |                                                         |                                                                 |
|---------------------------------------------------------|-----------------------------------------------------------------|
| 1. Manifold Box                                         | 9. Flow Meter                                                   |
| 2. Transformer                                          | 10. Thermal Actuator<br>(attached to internal<br>balance valve) |
| 3. Manual Air Vent                                      | 11. Return Manifold                                             |
| 4. Mix Valve                                            | 12. Supply Manifold                                             |
| 5. Isolation Ball Valve                                 | 13. End Cap                                                     |
| 6. Circulator                                           | 14. Vent/Purge Assembly                                         |
| 7. Trunk Isolation Ball Valve with<br>Temperature Gauge | 15. Valve Control Box                                           |
| 8. Manifold Bracket                                     |                                                                 |

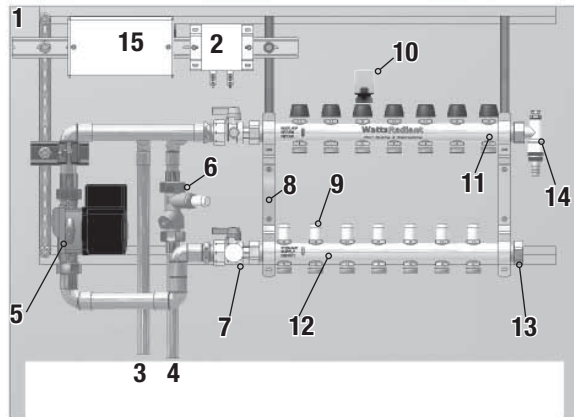
Any time circuit actuators are used on a Z Series manifold, it is important to use a Differential By-Pass on the manifold. Failure to do so may result in improper fluid flow through the circuits.

### ZMiniTube Panel (2-8 circuits):

ZMiniTube Panels are designed to be used with a remote injection bridge. Each distribution panel is complete with their own circulator and manifold assembly. Individual circuit actuators are an option, allowing for zone control of each circuit.

ZMiniTube panels require an injection circulator on the main distribution mechanical system.

Injection circulators are sized based on the required BTU load, allowable Delta T between the boiler loop and the remote zones, and corresponding pressure drop associated with the desired piping size. Refer to the Watts Radiant Design Manual for further details on injection circulator sizing.



#### ZMiniTube Panel

- |                                                         |                                                                 |
|---------------------------------------------------------|-----------------------------------------------------------------|
| 1. Manifold Box                                         | 9. Flow Meter                                                   |
| 2. Transformer                                          | 10. Thermal Actuator<br>(attached to internal<br>balance valve) |
| 3. From Injection Bridge (supply)                       | 11. Return Manifold                                             |
| 4. To Injection Bridge (return)                         | 12. Supply Manifold                                             |
| 5. Zone Circulator                                      | 13. End Cap                                                     |
| 6. FlowGuard Balance Valve                              | 14. Vent/Purge Assembly                                         |
| 7. Trunk Isolation Ball Valve with<br>Temperature Gauge | 15. Valve Control Box                                           |
| 8. Manifold Bracket                                     |                                                                 |

**Note: If a differential by-pass valve is used, it should only be closed during purging and should remain in the full, balanced position, for normal operation.**

Do not design for higher than 40 degree delta Ts. Doing so may result in an uneven floor surface temperature and/or improper flow through the heat source.

Watts Radiant does not recommend designing with radiant floor drops greater than 20°F. Doing so may result in very uneven floor temperatures.

### Differential Pressure By-Pass Valve

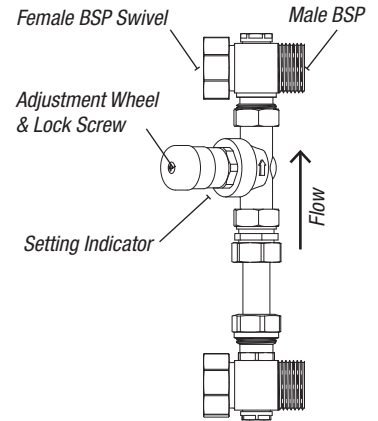
Differential Pressure By-Pass Valve attaches directly to the end of the Z Series Stainless Steel manifold. Vent/purge assemblies and manifold end caps attach directly to the pressure by-pass.

To adjust the valve setting, loosen the Locking Screw, turn the Adjustment Wheel to select a pressure setting (if known), retighten the Locking Screw.

If the pressure setting is unknown, turn on the heat source (a temperature rise will indicate flow), close the pressure valve, engage the circulator and slowly open the valve until flow begins moving through the by-pass. Close the valve a quarter turn.



Differential Pressure By-Pass Valve



### Thermal Actuator

Thermal Actuators connect directly to the return side of the Stainless Steel manifold. Wiring details may be found at the end of this manual.



Thermal Actuator

### Circuit Isolation Ball Valve

These in-line valves connect directly to the Stainless Steel manifold and may be installed on either the supply or return headers. Standard SS-T20 fittings connect directly to the isolation ball valve in the same manner as they would the manifold.



Circuit Isolation Ball Valve

## 5. Pump and Control Options

Primary Panels and Distribution Panels are pre-piped mechanical packages using primary/secondary piping configurations. Each panel may include any or all of the following items:

- pre-wired electrical packages, including controls and circulators
- circulators
- air vents
- isolation valves
- temp/pressure gauges
- check valves
- ball valves
- brackets
- supports
- mounting panel with cover

The base piping size is 1-1/4" copper with 3/4" zone piping. Refer to Table 1 for corresponding flow rates and BTU capacities. Make sure the pump selected is capable of the required flow rates. It is not advised to exceed a 40 degree Delta T between boiler supply and boiler return temperatures. Higher delta T may interfere with proper boiler operation. Consult boiler manufacturer details on proper Delta T ranges.

BTU Load	Delta T			
	10	20	30	40
40,000	8	4	3	2
50,000	10	5	3	3
60,000	12	6	4	3
70,000	14	7	5	4
80,000	16	8	5	4
90,000	18	9	6	5
100,000	20	10	7	5
110,000	22	11	7	6
120,000	24	12	8	6
130,000	26	13	9	7
140,000	28	14	9	7
150,000	30	15	10	8
160,000	32	16	11	8
170,000	34	17	11	9
180,000	36	18	12	9
190,000	38	19	13	10
200,000	40	20	13	10
210,000	42	21	14	11
220,000	44	22	15	11
230,000	46	23	15	12
240,000	48	24	16	12
250,000	50	25	17	13
260,000	52	26	17	13
270,000	54	27	18	14
280,000	56	28	19	14
290,000	58	29	19	15
300,000	60	30	20	15

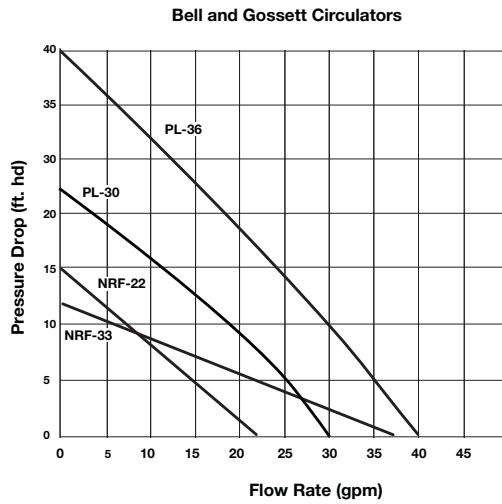
**Table 1** shows allowable HydroNex flow rates in gpm. Values in the shaded portion exceed the recommended flow rates. Allowable Delta T conditions are subject to system design. The shaded area indicates excessive design conditions and should be avoided.

**Circulators**

There are three circulator options when selecting a HydroNex panel: Bell and Gossett, Taco and Watts Radiant (Grundfos). If no circulator choice is indicated, a Watts Radiant circulator will be installed.

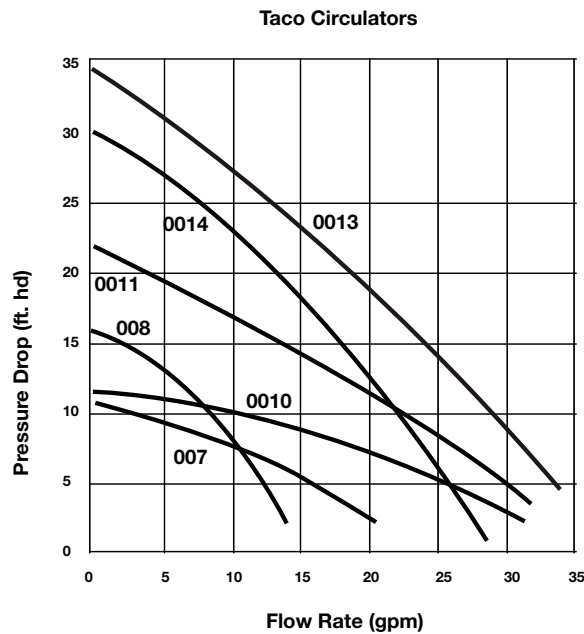
**Bell and Gossett Circulators**

NRF-22 circulators are available on D Series and P Series.  
 PL-30 and PL-36 circulators are only available on P Series.



**Taco**

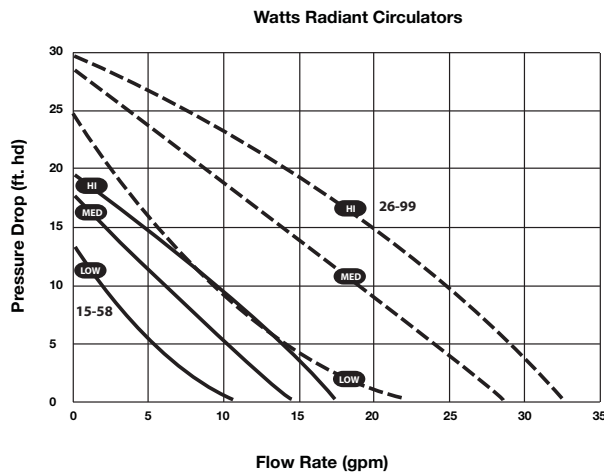
007 circulators are available only on D Series panels.  
 008 circulators are available only on P Series panels.  
 0011 circulators are available only on P Series panels.



**Watts Radiant (Grundfos)**

1558 series, 3 speed circulators are available on all HydroNex panels. Graph indicates speed-3 setting.

1558 and 2699 circulators are only available on P Series.



Watts Radiant offers three main circulator types with the HydroNex panel series: Bell and Gossett, Taco and Watts Radiant (Grundfos). When selecting a panel, make sure the system requirements fall within the given circulator capacity range. Failure to do so may result in improper heat delivery to the zone.

## Controls

HydroNex panels offer three main types of system control: basic relay, Tekmar 361 and Tekmar 256. Select the proper control strategy based on system need.

All panels are pre-wired to accept 120 volt power supply. A transformer (if necessary) is provided on each panel for the use of low voltage electrical components, such as reset controls, injection controls and thermostats. Do not connect high voltage to low voltage connections. Whenever possible, pre-wired CAT5 connections are provided for ease of installation.

If a priority zone, such as a DHW system, is present (Direct Panels and Hybrid panels) the first zone pump (from left to right) will be set aside for the priority zone. Make sure the controller is set to Priority. (note: the actual number of zones may vary, depending on the panel. On all controls, the last zone relay (zone 4 or zone 6) is set aside as the priority zone)

An alternate Watts Radiant relay control may be present on the HydroNex panel, depending on production date.

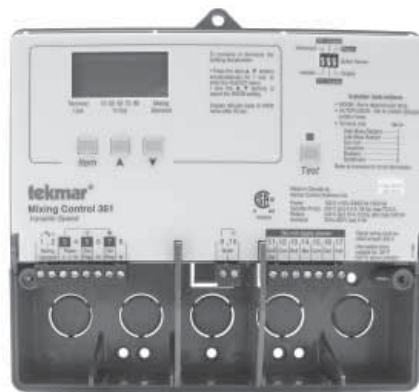
Corresponding wiring diagrams can be found at the end of this manual.

Injection controls are used on the DVIP panel or the DVIP-Hybrid panel. This control regulates the mix temperature delivered to the zones via an injection pump. The control (Tekmar 361) varies the circulator's speed to provide the proper mix temperature. Refer to the dedicated literature sheet for this item, found in the main information packet for the HydroNex panel.

Select Primary Panels use a Tekmar 256 reset control. This control provides dedicated boiler reset and control and should not be used if there are additional controls that already provide boiler reset. Communication between panels is provided via a CAT5 cable system. Simply plug in a CAT5 cable to connect the necessary panels. Refer to specific control literature for further details. Detailed electrical diagrams can be found at the end of this manual.



*Relay boxes are available in 4 or 6 zones with extension modules available. Two different styles of relay boxes may be used, depending on the electrical components used on the given HydroNex panel.*



*Tekmar 361 Injection Control*

*Tekmar 256 Boiler Control*

## 6. Electrical

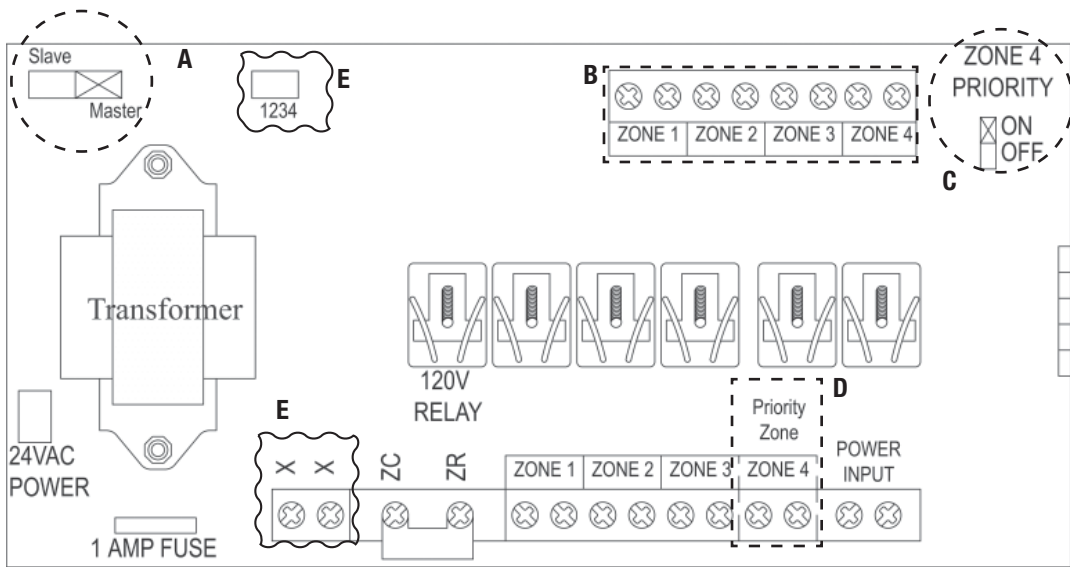
### Primary and Distribution Panels

Each HydroNex panel comes pre-wired with a 9 ft, 120 volt electrical plug. All necessary component wiring, including sensor wires, has been performed at the factory. CAT5 cable connections provide data transmission for relay signals and boiler demand between panels.

There are multiple uses for HydroNex panels and several possible installed configurations. This section of the manual will address the most common installation scenarios.

#### Basic Relay Details

D Series panels use a standard relay box consisting of either 4 or 6 circulator connections, depending on panel options. The provided relay box is composed of a prefabricated electrical board. Do not attempt to modify this board, or its components, as damage to the unit may occur. The following items on the board may require some attention:



Basic illustration of a 504 relay box. The switch located in the upper right hand corner of the box will set the last zone (zone 4 ) to priority control.

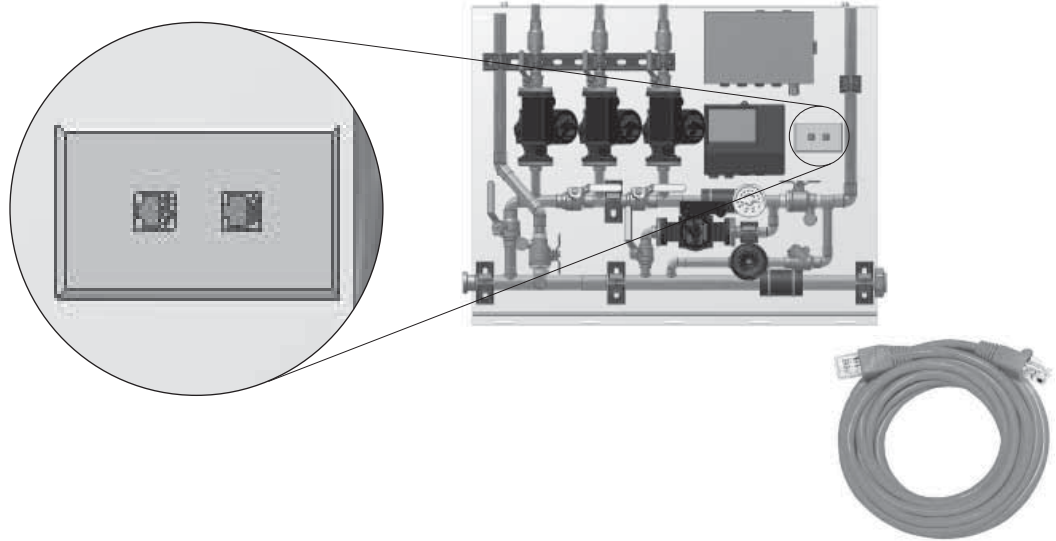
- A. Master/Slave Settings:** One panel must be designated as the Master Panel. This will either be the D Series panel that contains the Indirect Water Heater zone or the first D Series panel off the P Series. The remaining D Series panels must be set to Slave.
- B. Thermostat Connections:** Standard 2-wire (non-powered) thermostats connect to the TT terminals for each corresponding zone. Refer to the electrical appendix for further wiring details or if a powered thermostat is to be used. Z Series Panels utilize a relay box designed for thermal actuators and are not designed to communicate with other D or P Series panels.
- C. Priority Zone Switch:** If a DHW zone is used, set this to ON. Priority will dedicate all boiler capacity to the priority zone, allowing for quicker recovery of indirect water heaters. If a call for heat lasts for more than one hour, the control will return to normal operations.
- D. Priority Zone Connection:** On all panels, the First Circulator (far left on the panel) will be wired to the Priority Zone Contact (zone 4 or 6 on the relay box). All subsequent circulators will be wired in descending order.
- E. CAT-5 Connections:** Terminals 1234 provide communication between relay boxes and XX provided boiler demand. These connections are pre-wired for quicker installation.



## CAT-5 Connections

Each P and D Series panel is equipped with a CAT-5 Connections box, the top connection connects to the previous panel and the bottom connection connects to the next panel. These connections jumper the 1234 communications terminal on the relay box and transfers the boiler demand from each panel back to the primary. A six foot patch cable is required to complete this connection. If the

CAT-5 connections are provided to help reduce installation times. A standard CAT-5 Cable can be used to connect the HydroNex panel sections.

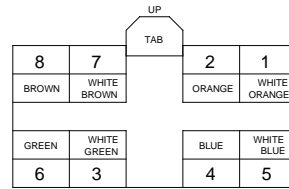


panels are not directly connected to each other, resulting in a wider separation between panels, a longer CAT 5 patch cable may be obtained at a local computer or electronics supplier.

### CAT-5 PIN Configuration

If a repair to a CAT-5 connection is required, or if a field jumper is produced, it is critical to follow standard 568-B wiring protocol.

Failure to do so may result in improper function or damage to one or more electrical components within the HydroNex system.



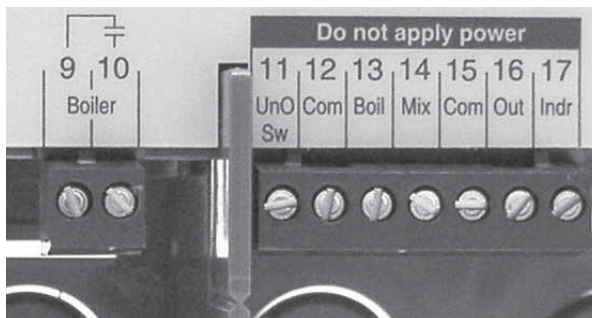
### PIN # Wire Color

- 1 White/Orange
- 2 Orange
- 3 White/Green
- 4 Blue
- 5 White/Blue
- 6 Green
- 7 White/Brown
- 8 Brown

### Field Wiring

When using a P Series panel, all connections are pre-wired to utilize the CAT-5 connection. The only field wired connection that will need to be made is the boiler connection to the 501 relay box or to the 256 boiler control unit. If using only a D Series (D Direct or DMix) panel it will be necessary to wire to the boiler module in the relay box (XX Terminals). For DVIPHybrid panels, it will be necessary to wire the boiler to the Tekmar 361, terminals 9 and 10 or 5 and 6 for the 256 boiler reset control. See corresponding Tekmar literature for further details.

All P and D Series HydroNex panels are provided with pre-wired power connections. To power the panel, plug the power cord into a standard 120 volt receptacle. Do not attempt to modify or change any wired component that is not described in this manual without first consulting the factory.



Tekmar 361 has boiler terminals located at 9 and 10.



Tekmar 256 has boiler terminals located at 5 and 6.

## Zone Panels

Electrical wiring can be brought in through the knock-outs located on the side of the enclosure. Thermostat connections are made through the top of the control box. Actuators are factory wired and should not require attention. To make thermostat connections, remove the control cover and wire the corresponding thermostat to the appropriate terminal. It may be necessary to remove any insulative jacket on the thermostat wire in order for the wiring to fit. Replace cover when all connections have been made. If a thermostat needs to control more than one actuator, jumper terminal 1 together. See appendix B for further details.

All Z Panels are field wired with 120 volt power supply. Power leads connect to provided terminal connections.

Detailed wiring schematics are located in the appendix.

## 7. Mounting Instructions

### Mounting HydroNex Primary and Distribution Panels

HydroNex panels use a unique mounting method which incorporates Panel Rails and Leveling Bolts to make minor adjustments. Use a stud finder to locate all necessary studs before attempting to mount the panel rails.

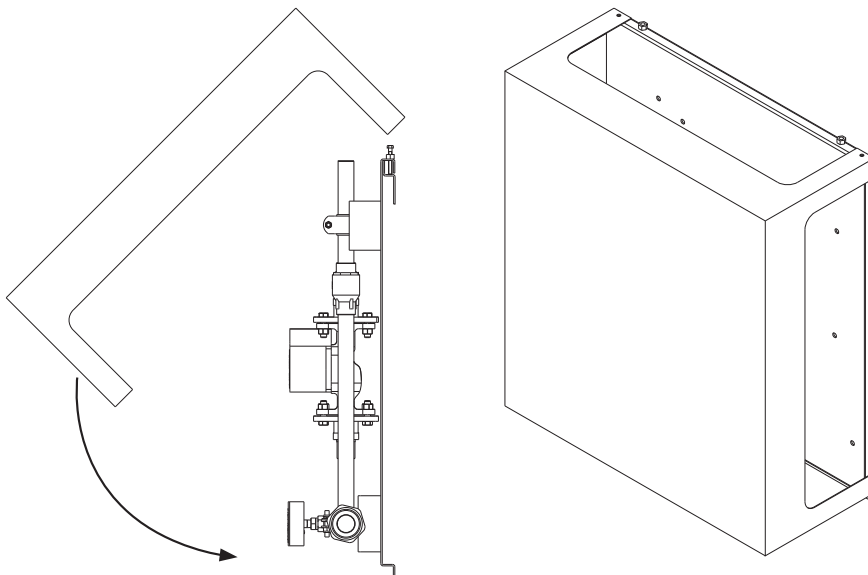
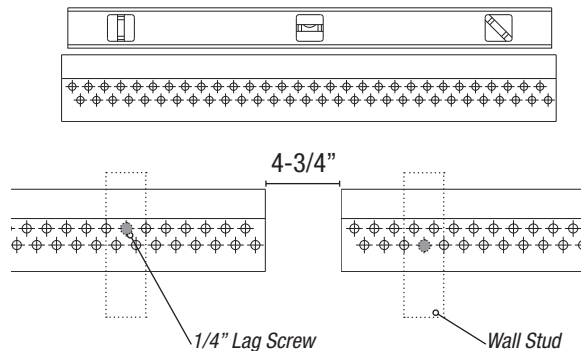
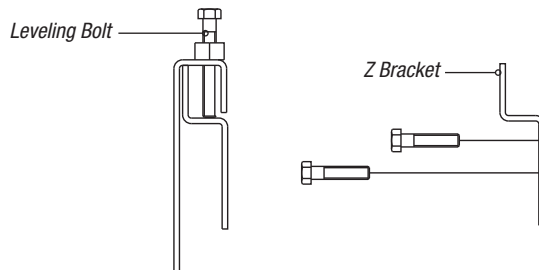
**Begin by mounting the panel rails to a secure wall. Refer to Appendix D for estimated panel weights. Make sure supports are anchored to a stud or other structural member. Do not attempt to anchor panel rails directly to dry-wall.**

Use a level to align the first panel rail. Secure rail to wall studs using a minimum of a 1/4" x 2-1/2" lag screw. The first rail must be secured with a minimum of 2 screws before proceeding to next rail. Leave 4-3/4" space between the two rails. Level and mount the second rail. Proceed in this fashion until all rails have been secured.

Place and secure the first HydroNex panel on the corresponding rail. Place the second HydroNex onto the second corresponding rail. If the unions do not align, use the Leveling Bolts located at the top of the HydroNex panel to align them. Repeat with each additional HydroNex panel.

For added support, anchor points are provided along the bottom of the back panel. These points are not intended to support the panel weight, but rather to help prevent the panel from lifting off the wall. If they are to be used to help support the panel weight, they must be aligned with a stud or other structural member.

Do not hang the cover panels until all of the HydroNex panels are in place and aligned. To hang the cover plate, lift the cover above the panel at a 45° angle and bring the cover down slowly until it rests on the back panel. Two anchor pins are located on the back panel



Any standard thermostat can be used with a HydroNex panel.

When using Z Panels, the zone actuator control box only requires a 2-wire connection. If using a 4-wire actuator, the endswitch does not connect to the control.

that insert into the cover panel. Once the anchors are in place, lower the cover panel until it rests against the back panel.

When mounting a HydroNex panel, make sure the rail is properly secured to the wall structure. Failure to do so may result in damage to the HydroNex panel, other system components or the installer.

### Mounting Zone Panels

ZPanels are available with or without the zone circulator. Non-pump ZPanels are designed to be used with P and D series HydroNex panels. ZPanels with pumps are zone based panels designed on the assumption the main mechanical room piping will be field constructed.

Options for ZPanels include mixing devices, circulators, manifolds and individual thermal actuators, depending on the style chosen.

In most cases, ZPanels are recess mounted into a frame wall. It may be necessary to modify the framing to accommodate the panel enclosure.

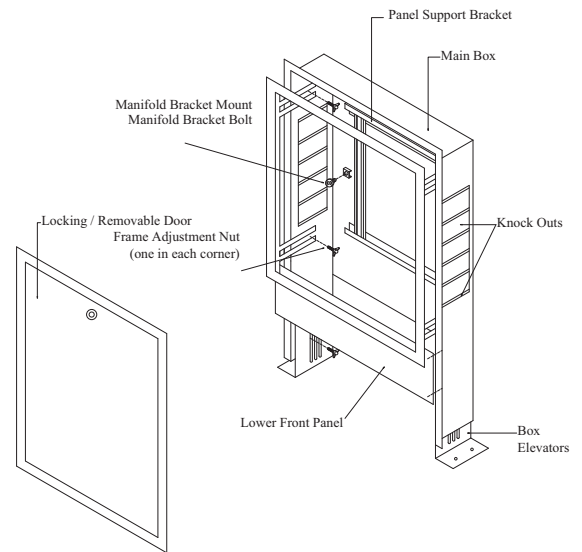
### General Assembly Instructions

1. Remove and set aside the door.
2. Adjust box height by using the Box Elevators located on the sides with (2) Wing Bolts and Washers.
3. Adjust frame depth to wall requirements by using the (4) Wing Bolts and washers locked in the inside four corners.
4. Secure the Main Box in the frame wall.
5. Slide the vertical Manifold Bracket Mounts into the horizontal Manifold Support Brackets. Secure the manifold brackets to the Manifold Support Bracket using the Locking Rail Nut and Hex Head Bolt.
6. Knock out the supply /return knock-outs on either side, as needed.
7. Install the door frame by resting it on the lower rail of the frame and lift. Secure door via the lock.

Manifold box sizes are as follows:

- S (small): 16" x 28-1/2" x 4-1/2"
- M (medium): 25" x 28-1/2" x 4-1/2"
- L (large): 40" x 28-1/2" x 4-1/2"

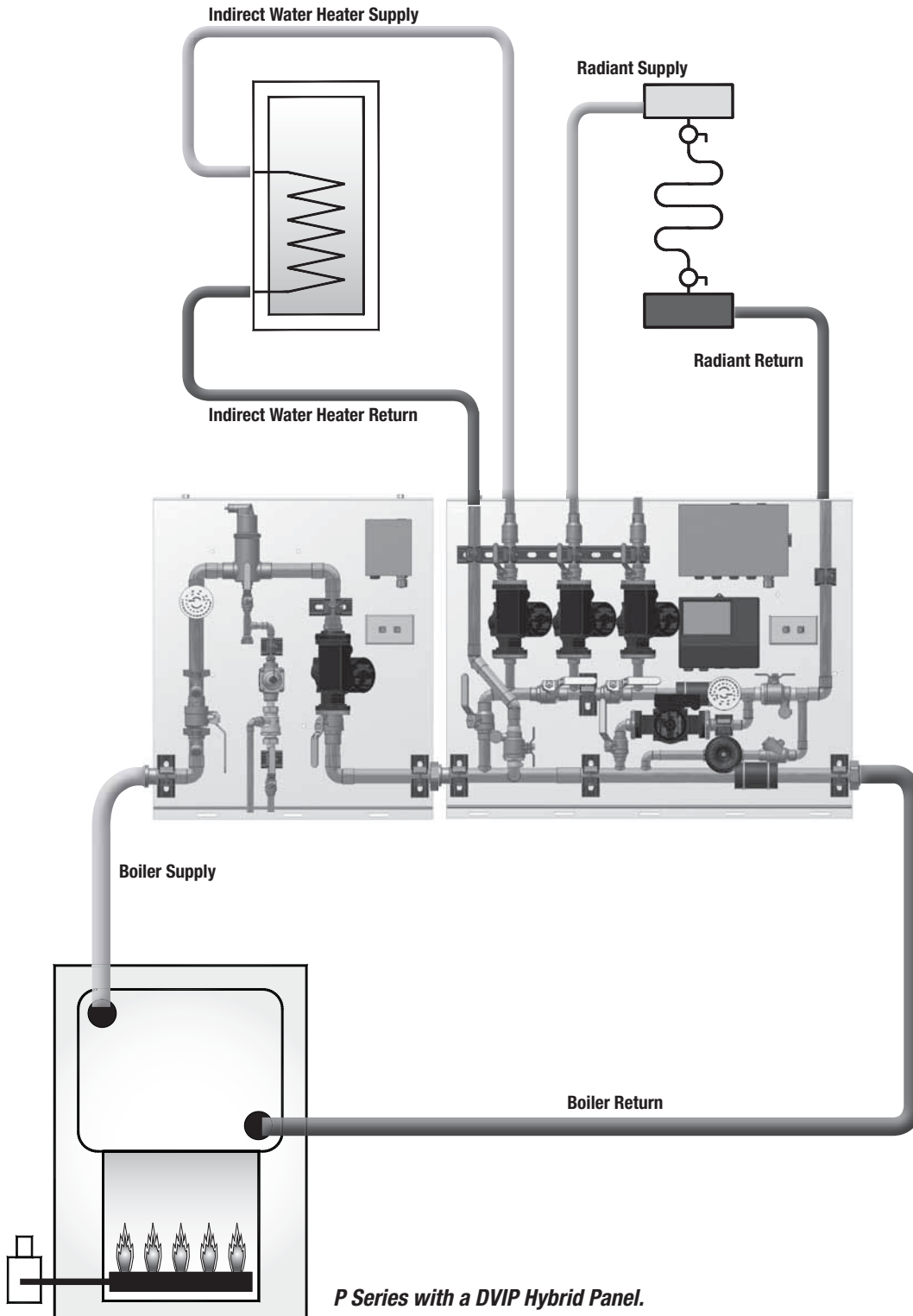
To connect radiant tubing to the manifolds it may be necessary to remove the Lower Front Panel. This is accomplished by first removing the expandable box frame and then removing the four screws located on the outside edges of the panel.

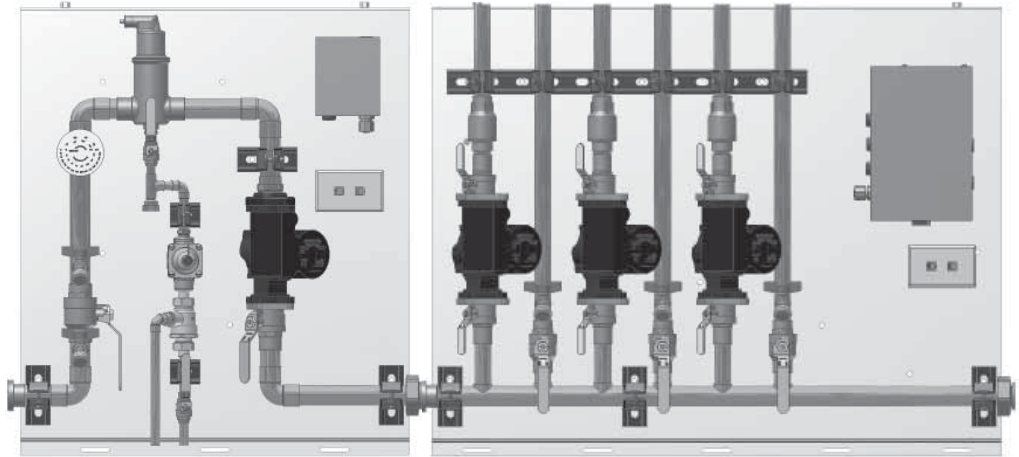


## Appendix A: Typical Piping Configurations

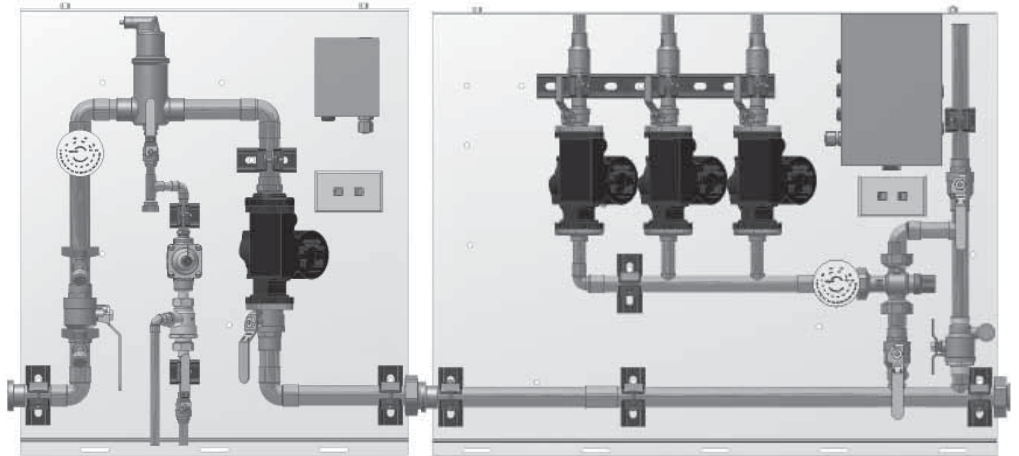
Basic panel configurations. Actual configuration will vary depending on mechanical needs and panel option used (covers not shown).

All illustrations in this section assume standard piping practices to and from the heat source. Refer to boiler manufacturer's installation manuals for specific details related to the heat source.

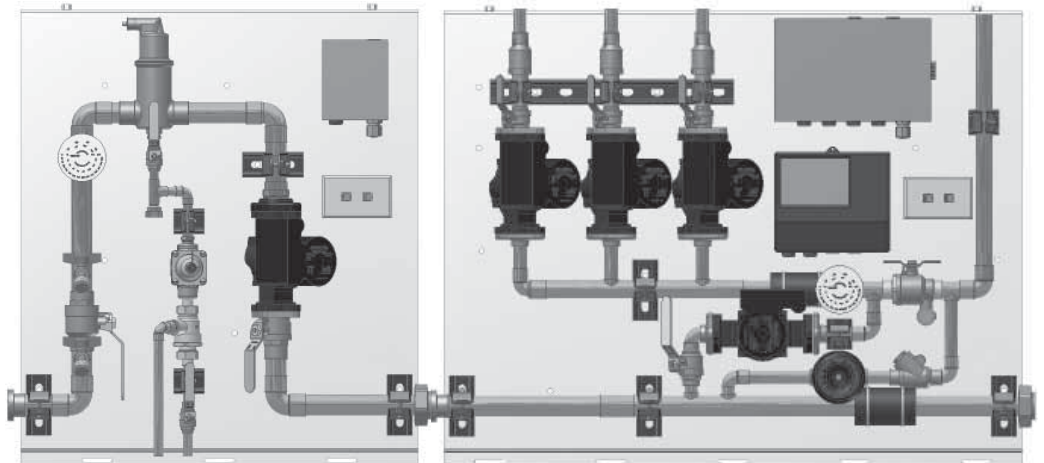




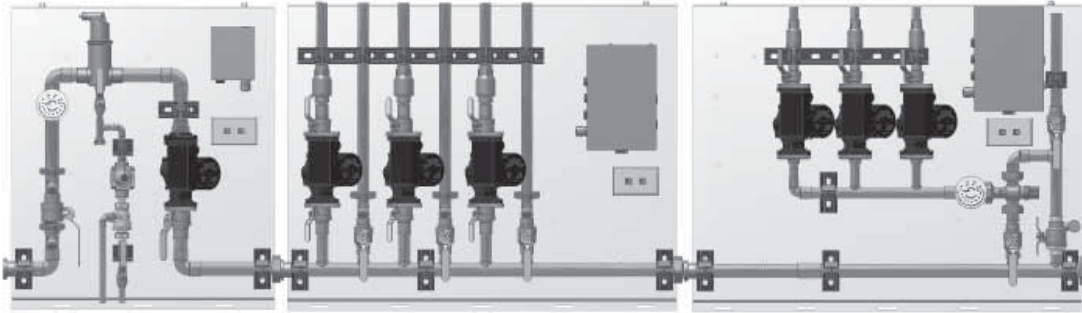
***P Series with a D Direct Panel.***



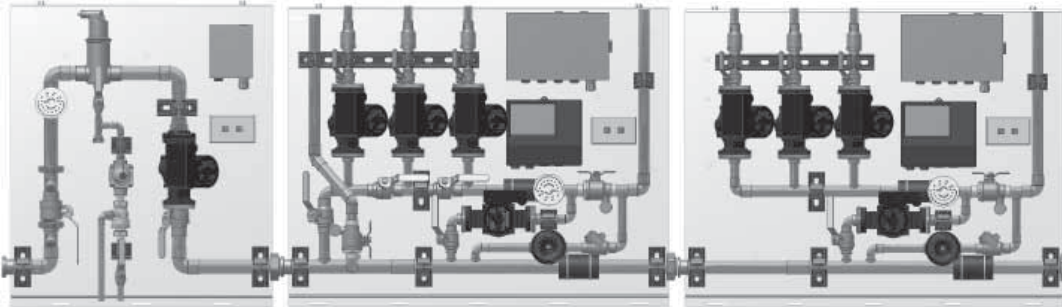
***P Series with a DMix Panel.***



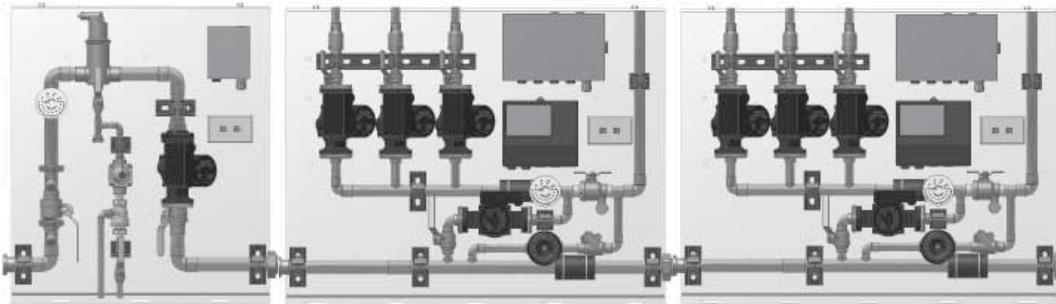
***P Series with a DVIP Panel.***



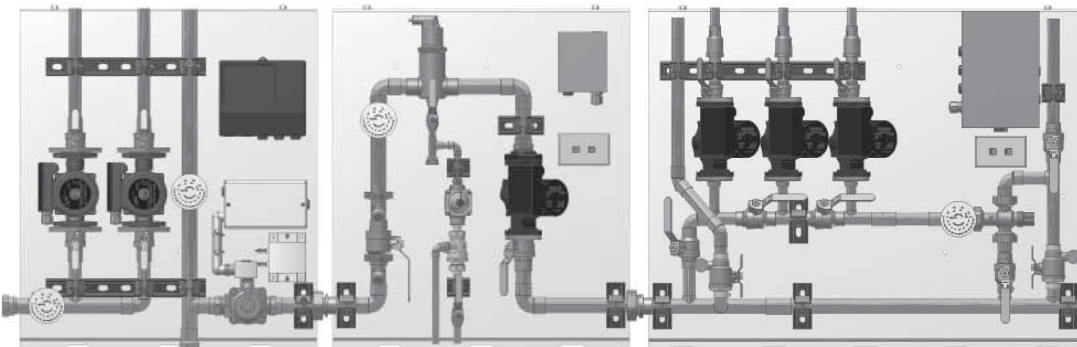
***P Series with a D Direct and DMix Panel.***



***P Series with a DVIP Hybrid and DVIP Panel.***



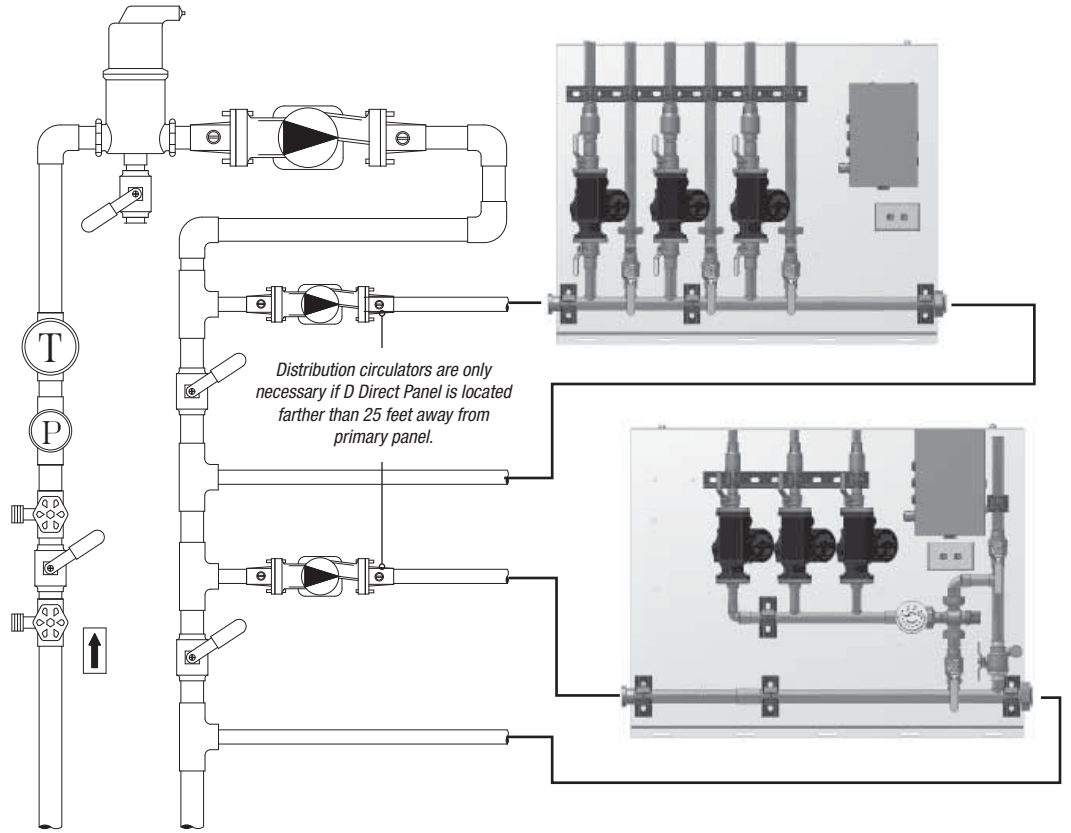
***P Series with two DVIP Panels.***



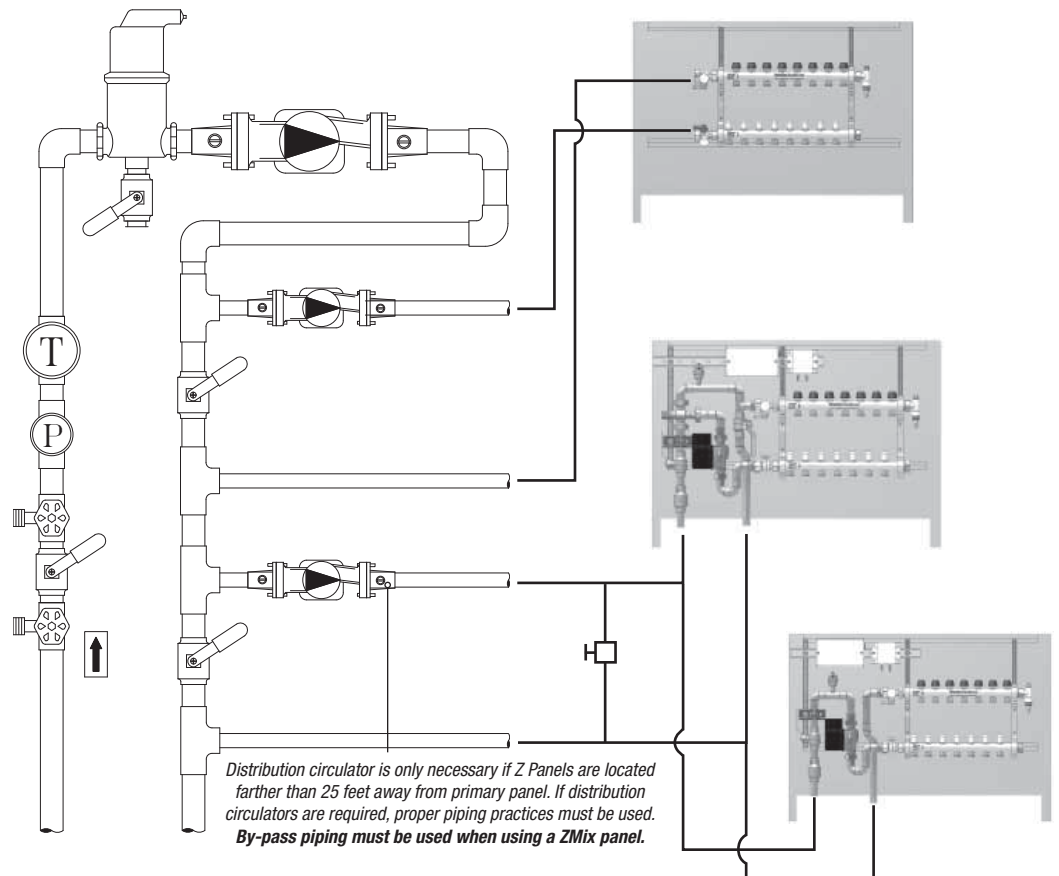
***GeoThermal with P Series and a DMix Hybrid.***

Parallel piping methods will allow the same water temperature to be present at each designated location.

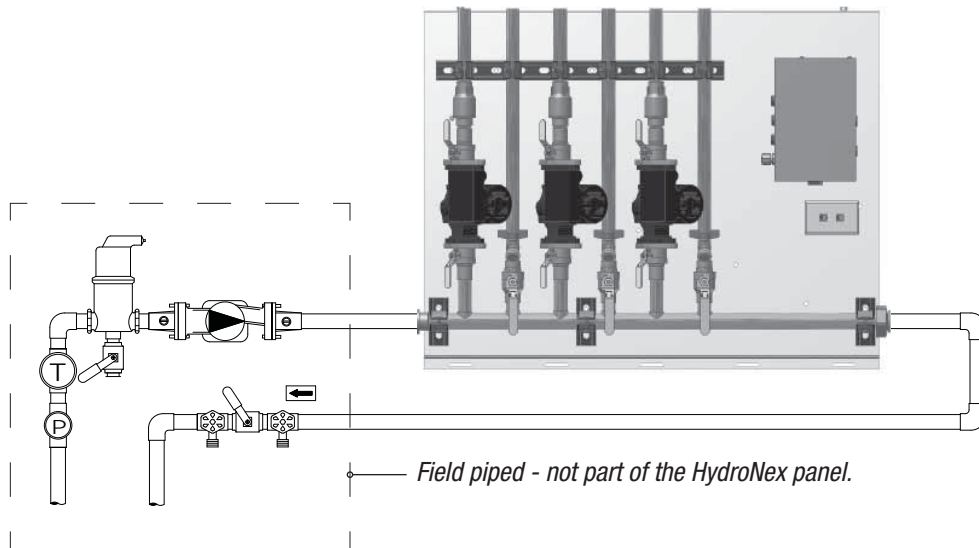
Serial piping methods will cause water temperatures to decrease as they move through the system.



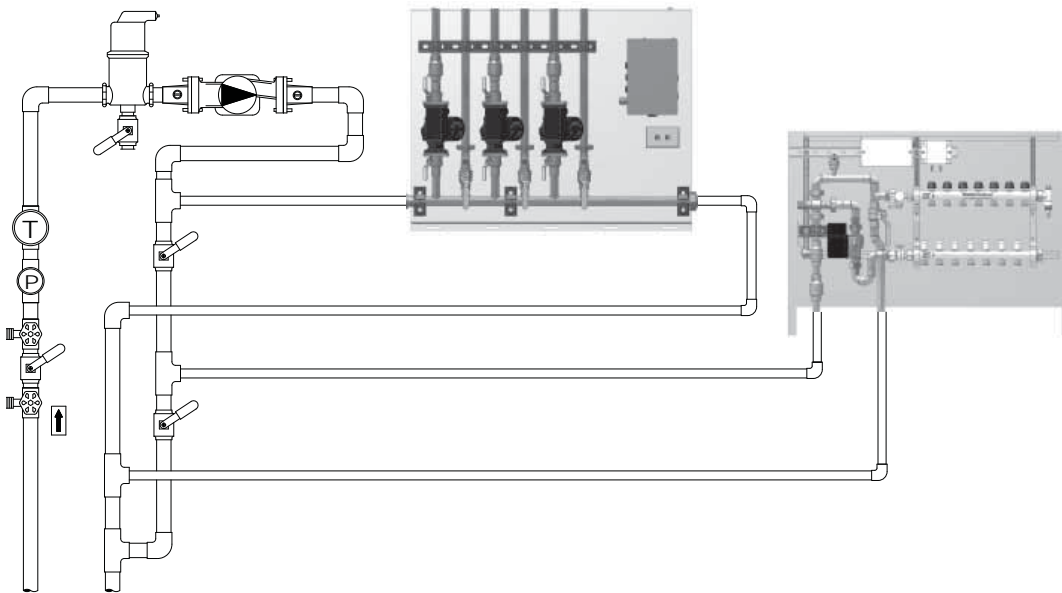
**Field constructed primary loop with a D Direct and DMix panel. Series piping illustrated.**



**Field constructed primary loop with various Z Series panels. Series and parallel piping illustrated.**



***D Direct Series piping to a condensing boiler.***



***Field piped parallel primary loop with D Direct and ZMix panel.***

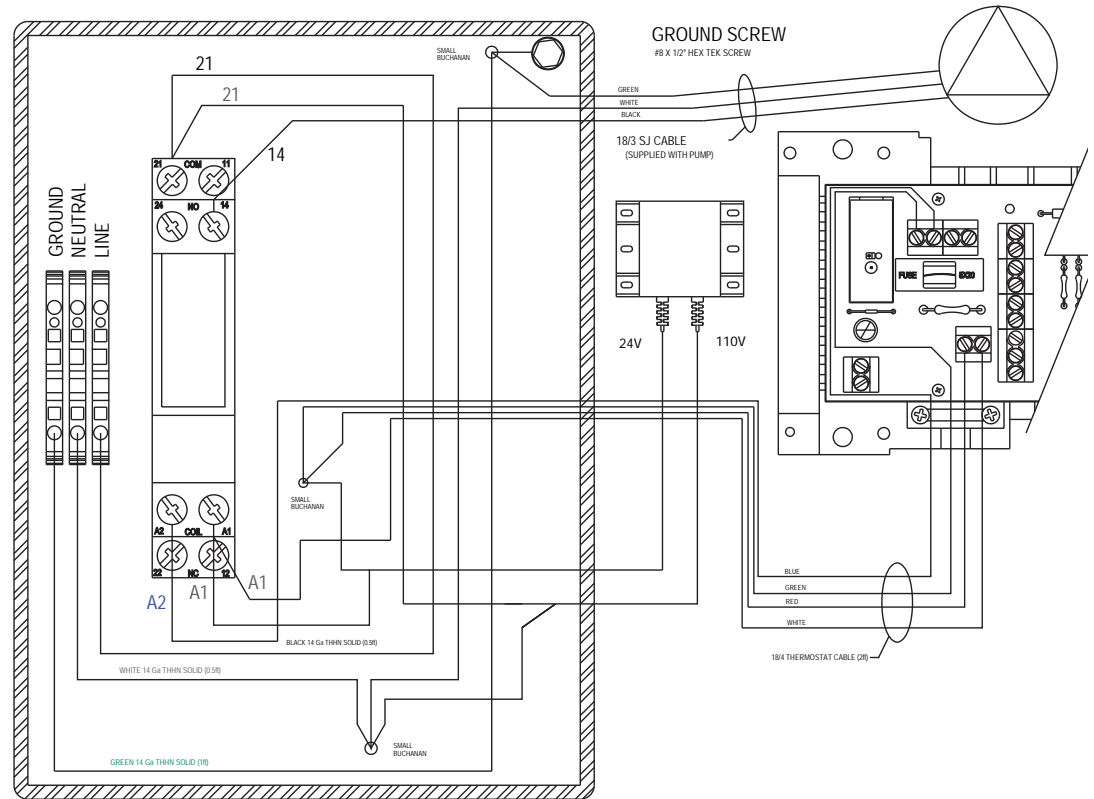
Under certain conditions, such as with the use of a condensing boiler, Direct panels can be connected directly to the heat source, if such piping arrangements are approved by the boiler manufacturer and provided the following conditions apply:

- Proper flow is maintained through the heat source.
- Heat source can be set to desired temperature setting (no mixing required).
- No minimum return fluid temperature is required for the heat source.
- All necessary conditions and piping practices, as outlined by the heat source manufacturer, are properly maintained.

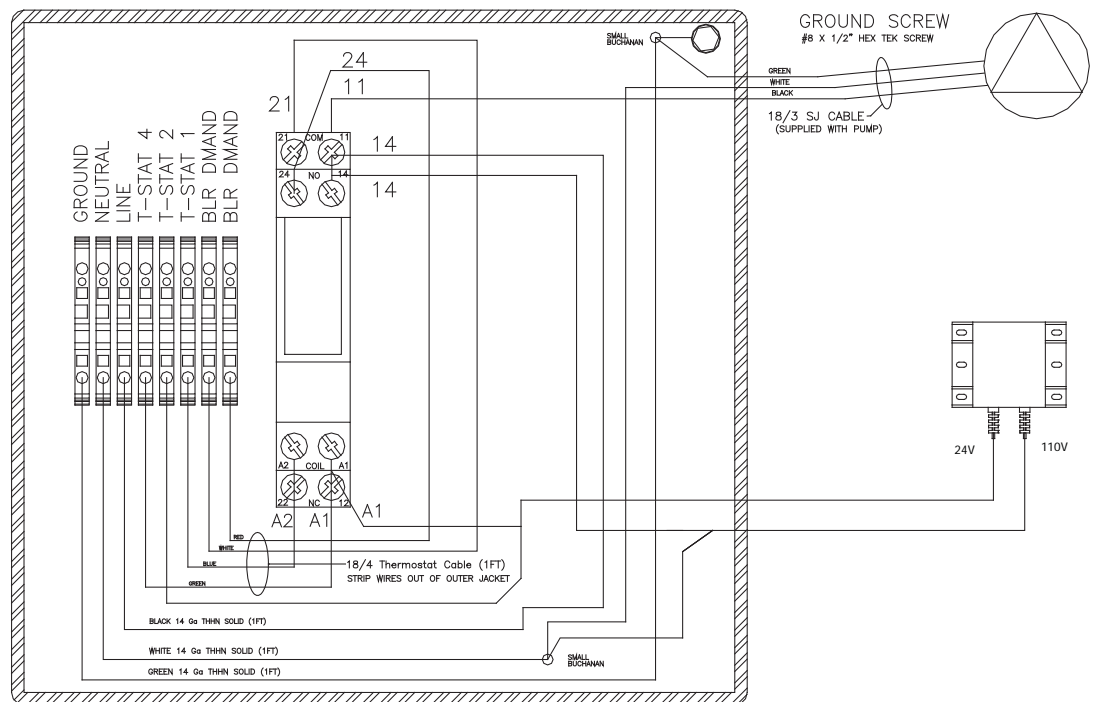


**Illustration A: ZPump Panel wiring - with and without circuit actuators.**

Verify all thermostat wiring requirements before connecting them to the HydroNex panel. Various power requirements may dictate different wiring needs than those shown in this manual. Consult thermostat manufacturer for further wiring details.

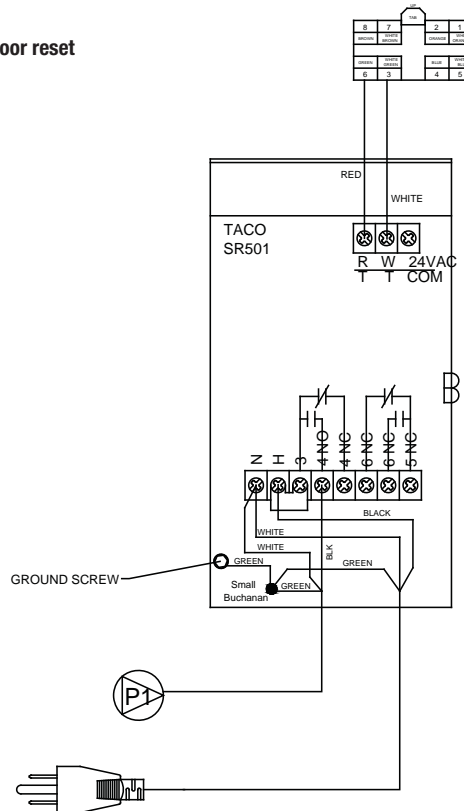


**ZPump Panel with circuit thermal actuators.**

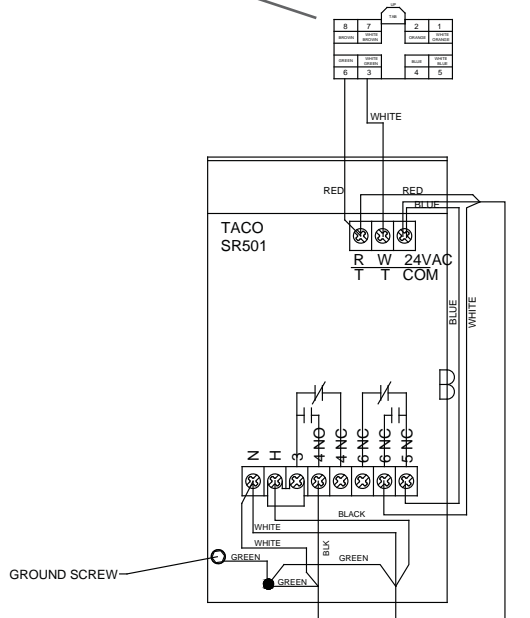


**ZPump Panel without circuit thermal actuators.**

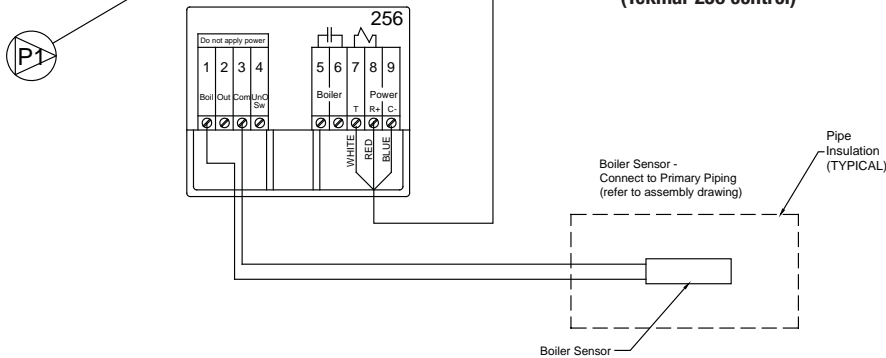
**P Series Panel without outdoor reset**



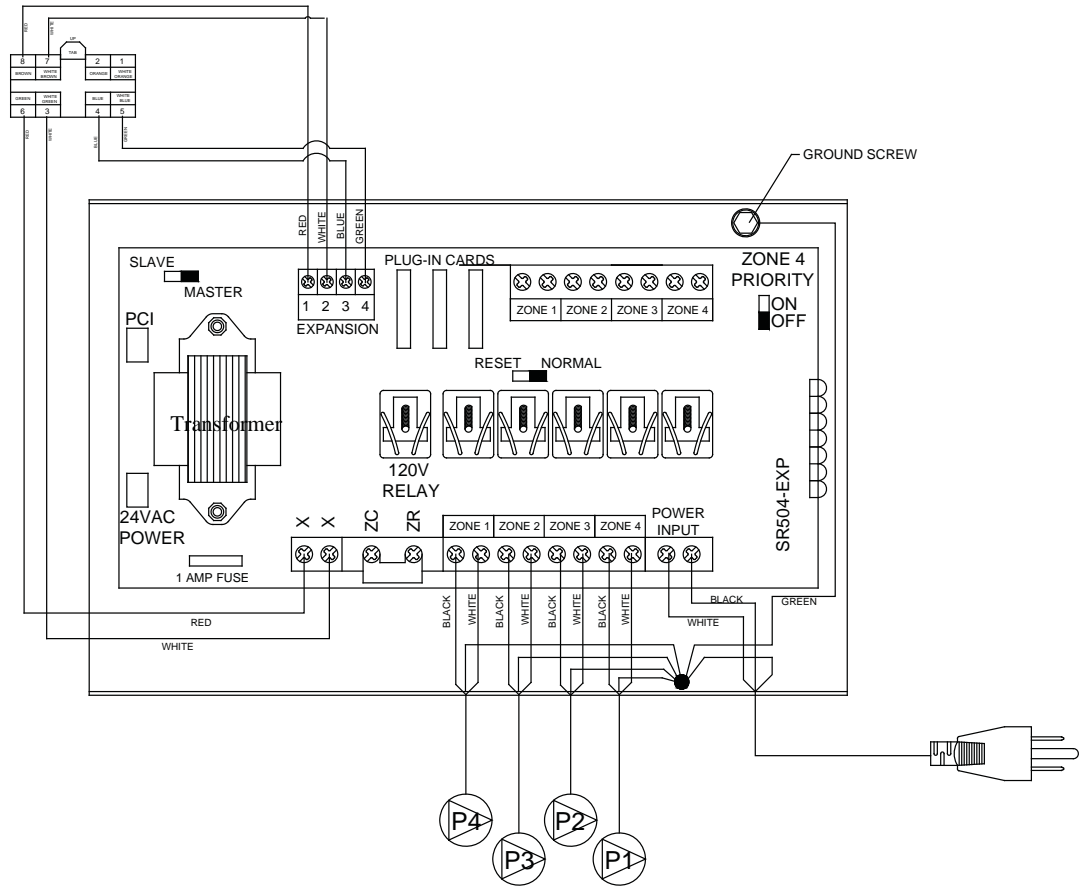
CAT-5 connections are pre-wired at the factory and do not require field wiring. Connect each HydroNex panel with the use of the included CAT-5 cable.



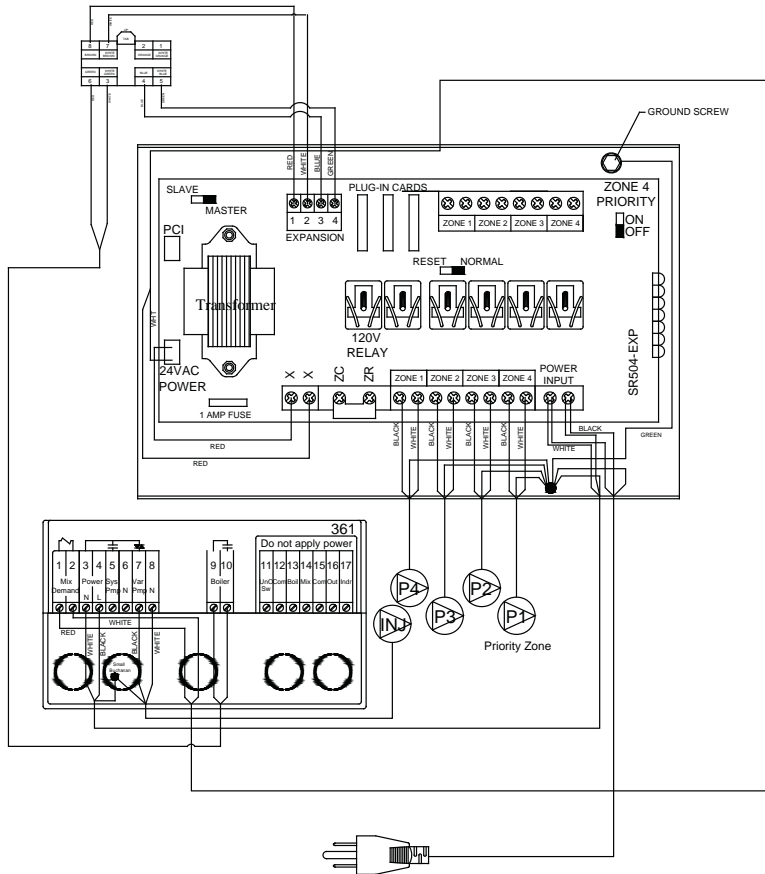
**P Series Panel with outdoor reset  
(Tekmar 256 control)**



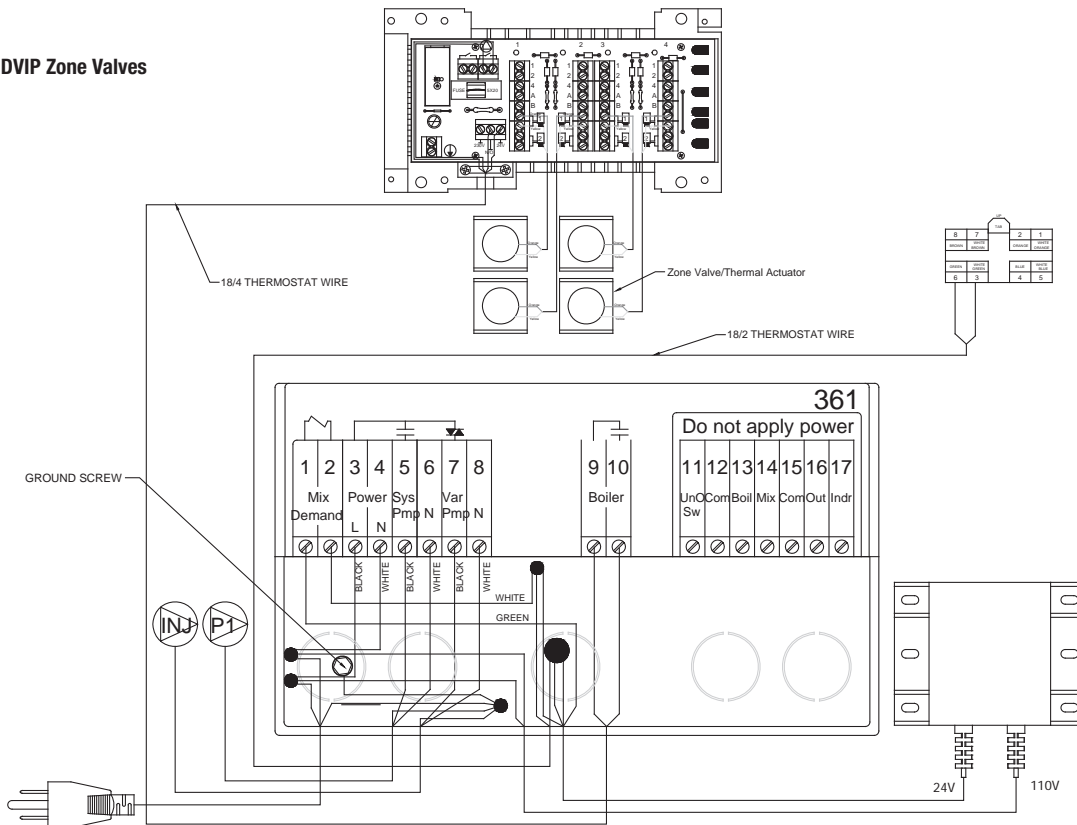
**Illustration C: D Series Direct, DMix, and DMix Hybrid Wiring**

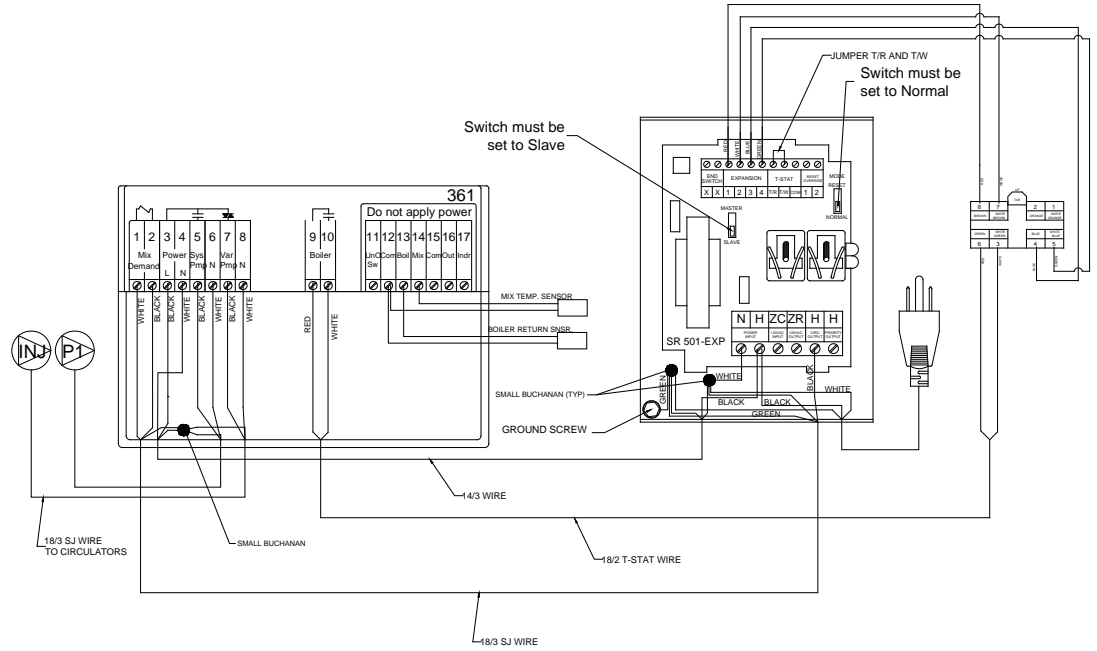


DVIP and DVIP Hybrids

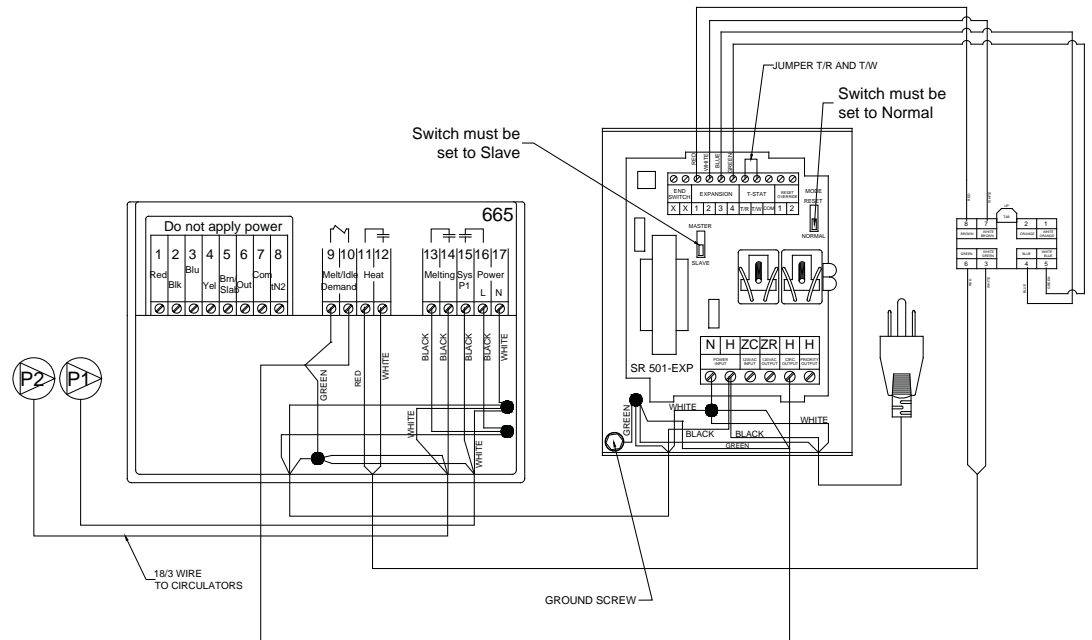


DVIP Zone Valves



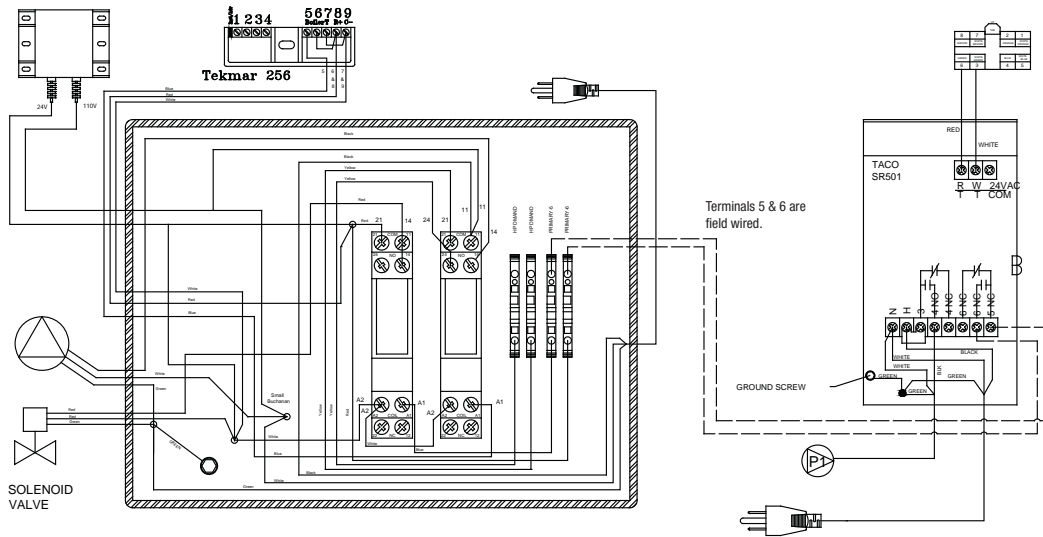


**DHX with 361 Control**

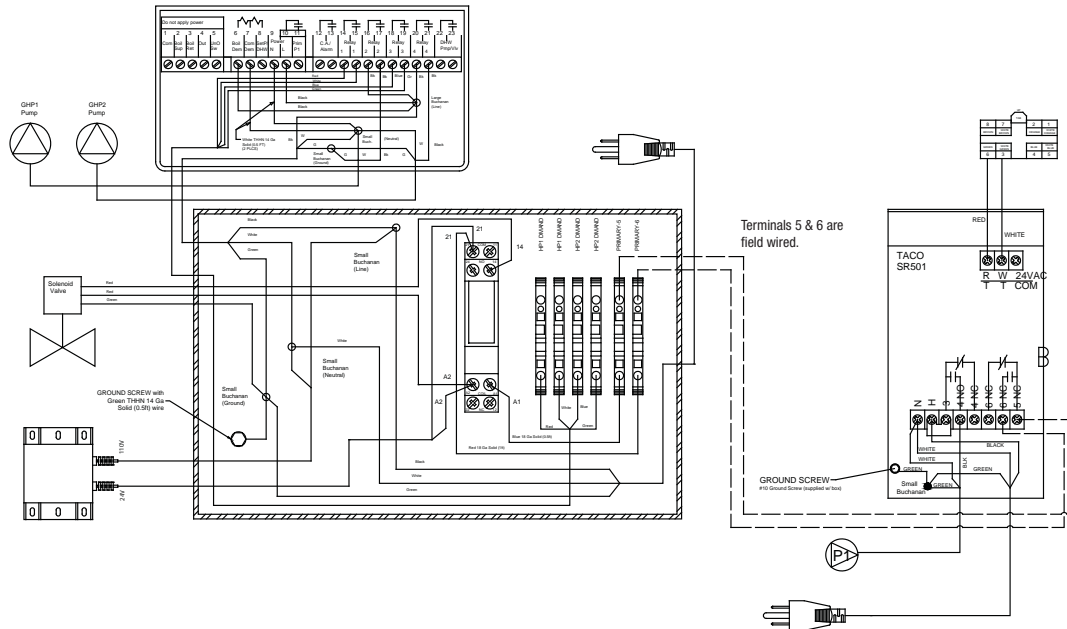


**DHX with 665 Control**

**Illustration F: GeoThermal Panel with reset control**



**Single GeoThermal heat source.**



**Two GeoThermal heat sources.**

The following chart is to be used to quickly select an expansion tank. Detailed sizing instructions can be obtained from the corresponding expansion tank manufacturer.

<b>WATTS ET SERIES SIZING CHART</b>				
Precharge: 12psi (82 kPa) Relief Pressure: 30psi (206.7 kPa)				
System Operating Temperature: 200°F (93°C)				
<b>TYPE OF RADIATION</b>				
Boiler Output Net BTU's	Finned Tube Baseboard	Convectors or Unit Heaters	TYPE OF RADIATION	
			Radiators Cast Iron	Baseboard Cast Iron
25,000	ET-15	ET-15	ET-15	ET-15
50,000	ET-15	ET-15	ET-30	ET-30
75,000	ET-30	ET-30	ET-30	ET-60
100,000	ET-30	ET-30	ET-60	ET-60
125,000	ET-30	ET-60	ET-60	ET-90
150,000	ET-30	ET-60	ET-90	ET-90
175,000	ET-60	ET-60	—	—
200,000	ET-60	ET-60	—	—
250,000	ET-60	ET-90	—	—
300,000	ET-90	—	—	—
<b>Radiant Tube</b>	<b>Est.</b>			
<b>Volume (gal.)</b>	<b>Tank Size</b>			
20	ET-15			
40	ET-30			
55	ET-60			
100	ET-90			

## Appendix D: Panel Sizes and Estimated Weights

Weight values are estimated for mechanical components and enclosures only and does not include water or control variances. Slight variance may occur between pump options

Item	Est. Weight (lbs)	Size
Small Cover	22 – 25	26.25"W x 29.25"H x 11"D
Medium Cover	28 – 30	38.25"W x 29.25"H x 11"D
Large Cover	37 – 40	50.25"W x 29.25"H x 11"D
Small Panel (S)		26"W x 29"H x 12"D
Medium Panel (M)		38"W x 29"H x 12"D
Large Panel (L)		50"W x 29"H x 12"D
P-Panel	55 – 60	S
D-Direct, 1 Zone	55 – 60	S
D-Direct, 2 Zone	90 – 95	S
D-Direct, 3 Zone	120 – 125	M
D-Direct, 4 Zone	155 – 160	L
D-Direct, 5 Zone	185 – 190	L
D-Mix, 1 Zone	60 – 65	S
D-Mix, 2 Zone	80 – 85	S
D-Mix, 3 Zone	95 – 100	M
D-Mix Hybrid, 2 Zone	85 – 90	S
D-Mix Hybrid, 3 Zone	105 – 110	M
D-Mix Hybrid, 4 Zone	150 – 155	M
DVIP, 1 Zone	85 – 90	S
DVIP, 2 Zone	120 – 125	S
DVIP, 3 Zone	140 – 145	M
DVIP, 4 Zone	170 – 175	M
DVIP, 5 Zone	200 – 205	L
DVIP Hybrid, 2 Zone	115 – 120	M
DVIP Hybrid, 3 Zone	140 – 145	M
DVIP Hybrid, 4 Zone	170 – 175	L
DVIP Hybrid, 5 Zone	200 – 205	L
ZZone Panels (1-4 Circuits)	30 – 40	29.25"H x 25.5"W x 4.5"D
(5-10 Circuits)	50 – 65	29.25"H x 41.5"W x 4.5"D
ZPumpZone Panels	65 – 75	29.25"H x 41.5"W x 4.5"D
ZMixPumpZone Panels	70 – 80	29.25"H x 41.5"W x 4.5"D
ZMiniTube Panels	65 – 75	29.25"H x 41.5"W x 4.5"D



Always consult accompanying technical sheet before attempting these suggested solutions. Contact Watts Radiant for further assistance if the solution can not be found in either the accompanying documentation or within this trouble shooting guide.

**No power to panels**

- a. Verify circuit breaker is not tripped and 120VAC power is present at outlet.
- b. Verify 120V power connection on panel is connected to outlet and has power.

**P Panel not operating correctly.**

- a. Verify circuit breaker is not tripped and 120VAC power is present at outlet.
- b. Verify 120V power connection on panel is connected to outlet and has power.
- c. Verify 1 amp fuse on relay box is not blown.
- d. Verify 24VAC transformer is functioning and 24VAC is present.
- e. Check Thermostat connection at relay box and all operational functions are set properly (see manufacturers instructions).
  1. Is there a call from the thermostat(s)?
- f. Verify there is flow.
  1. Is the system air locked?
  2. Is the circulator running?
  3. Is 120V power present at circulator(s)?

**P Panel running, Boiler is not firing**

- a. Verify all power and fuel connections to boiler.
- b. Check wiring connections from P Panel relay box to TT on boiler are present and correct; i.e. normally open or normally closed (see boiler installation instructions).
- c. Check system pressure is at least 12psi.
- d. Check Thermostat connection at relay box and all operational functions are set properly (see manufacturers instructions).
  1. Is there a call from the thermostat(s)?
- e. Verify there is flow.
  1. Is the system air locked?
  2. Is the circulator running?
  3. Is 120V power present at circulator(s)?

**DVIP or DVIP Hybrid Panel not operating correctly.**

- a. Verify all power and fuel connections to boiler.
- b. Verify circuit breaker is not tripped and 120VAC power is present at outlet.
- c. Verify 120V power connection on panel is connected to outlet and has power.
- d. Check wiring connections from 361 to relay box on P Panel are present and correct (see schematics).
- e. Verify 1 amp fuse on relay box is not blown.
- f. Verify 24VAC transformer is functioning and 24VAC is present.
- g. Check Thermostat connection at relay box and all operational functions are set properly (see manufacturers instructions).
  1. Is there a call from the thermostat(s)?
- h. Verify there is flow.
  1. Is the system air locked?
  2. Is the circulator running?
  3. Is 120V power present at circulator(s)?
- i. Check settings on 361. Are they the proper settings for your boiler type and system requirements (see Tekmar D 361 Brochure for proper setup).
- j. Check all wiring connections and resistance (Ohm readings) on Tekmar sensors (10,000 Ohm's) i.e. Boiler Supply sensor, Boiler Return sensor, mix sensor and Outdoor sensor. See Tekmar brochure for ohm-to-temperature chart.
- k. Check system pressure is at least 12psi.

**DVIP or DVIP Hybrid Panel not operating correctly (multiple DVIP Panels).**

- a. Verify circuit breaker is not tripped and 120VAC power is present at outlet.
- b. Verify 120V power connection on panel is connected to outlet and has power.
- c. Check wiring connections from 361 to relay box on P Panel are present and correct (see schematics).
- d. Check wiring connections between 361's on DVIP Panels are present and correct (see schematics).
- e. Check Expansion wiring connections between relay boxes on DVIP Panel's are present and correct (see schematics) if required.
- f. Verify 1 amp fuse on relay boxes are not blown.
- g. Verify 24VAC transformers are functioning and 24VAC is present.
- h. Check Thermostat connection at relay box and all operational functions are set properly (see manufacturers instructions).
  1. Is there a call from the thermostat(s)?
- i. Verify there is flow.
  1. Is the system air locked?
  2. Is the circulator running?
  3. Is 120V power present at circulator(s)?
- j. Check settings on 361. Are they the proper settings for your boiler type and system requirements (see Tekmar D 361 Brochure for proper setup).
- k. Check all wiring connections and resistance (Ohm readings) on Tekmar sensors (10,000 Ohm's) i.e. Boiler Supply sensor, Boiler Return sensor, mix sensor and Outdoor sensor. See Tekmar brochure for ohm-to-temperature chart.
- l. Check system pressure is at least 12psi.

**DVIP or DVIP Hybrid Panel, Tekmar 361 not mixing.**

- a. Verify circuit breaker is not tripped and 120VAC power is present at outlet.
- b. Verify 120V power connection on panel is connected to outlet and has power.
- c. Check wiring connections from 361 to relay box on P Panel are present and correct (R on P Panel relay box to 9 on 361, W on P Panel relay box to 10 on 361).
- d. Check wiring connections between 361's on DVIP Panels are present and correct (see schematics).
- e. Check Expansion wiring connections between relay boxes on DVIP Panel's are present and correct (see schematics) if required.
- f. Verify 1 amp fuse on relay boxes are not blown.
- g. Verify 24VAC transformers are functioning and 24VAC is present.
- h. Check Thermostat connection at relay box and all operational functions are set properly (see manufacturers instructions).
  1. Is there a call from the thermostat(s)?
- i. Verify there is flow.
  1. Is the system air locked?
  2. Is the circulator running?
  3. Is the injection circulator running?
  4. Is 120V power present at circulator(s)?
- h. Check settings on 361. Are they the proper settings for your boiler type and system requirements (see Tekmar D 361 Brochure for proper setup).
- i. Check all wiring connections and resistance (Ohm readings) on Tekmar sensors (10,000 Ohm's) i.e. Boiler Supply sensor, Boiler Return sensor, mix sensor and outdoor sensor.
- j. Check system pressure is at least 12psi.

**Priority zone (DHW) on hybrid panel is not operating correctly.**

- a. Verify relay box the DHW aquastat is connected to is set to Master and not Slave.
- b. Verify all subsequent relay boxes (if present) are set to Slave.
- c. Verify all CAT 5 connections are in place between HydroNex panels.

**DMix or DMix Hybrid Panel not operating correctly.**

- a. Verify all power and fuel connections to boiler.
- b. Verify circuit breaker is not tripped and 120VAC power is present at outlet.
- c. Verify 120V power connection on panel is connected to outlet and has power.
- d. Check wiring connections from relay box on DMix or DMix Hybrid Panel to relay box on P Panel are present and correct (see schematics).
- e. Verify 1 amp fuse on relay box is not blown.
- f. Verify 24VAC transformer is functioning and 24VAC is present (if applicable).
- g. Check Thermostat connection at relay box and all operational functions are set properly (see manufacturers instructions).
  1. Is there a call from the thermostat(s)?
- h. Verify there is flow.
  1. Is the system air locked?
  2. Is the circulator running?
  3. Is 120V power present at circulator(s)?
  4. Is required system flow greater than 3.2 (valve Cv)? If so, the pressure drop through the valve may be too high for the zone circulator(s).
- i. Check settings on Tekmar 256, if applicable. Are they the proper settings for your boiler type and system requirements (see Tekmar D 256 Brochure for proper setup)
- j. Check all wiring connections and resistance (Ohm readings) on Tekmar sensors (10,000 Ohm's) i.e. Boiler supply sensor, boiler return sensor. See Tekmar brochure for ohm-to-temperature chart.
- k. Check system pressure is at least 12psi.

**DMix or DMix Hybrid Panel not mixing.**

- a. Verify all power and fuel connections to boiler.
- b. Verify circuit breaker is not tripped and 120VAC power is present at outlet.
- c. Verify 120V power connection on panel is connected to outlet and has power.
- d. Check wiring connections from relay box on DMix or DMix Hybrid Panel to relay box on P Panel are present and correct (see schematics).
- e. Verify 1 amp fuse on relay box is not blown.
- f. Verify 24VAC transformer is functioning and 24VAC is present (if applicable).
- g. Check Thermostat connection at relay box and all operational functions are set properly (see manufacturers instructions).
  1. Is there a call from the thermostat(s)?
- h. Verify there is flow.
  1. Is the system air locked?
  2. Is the circulator running?
  3. Is 120V power present at circulator(s)?
  4. Is required system flow greater than 3.2 (valve Cv)? If so, the pressure drop through the valve may be too high for the zone circulator(s).
- i. Check settings on Tekmar 256, if applicable. Are they the proper settings for your boiler type and system requirements (see Tekmar D 256 Brochure for proper setup)
- j. Check all wiring connections and resistance (Ohm readings) on Tekmar sensors (10,000 Ohm's) i.e. Boiler supply sensor, boiler return sensor. See Tekmar brochure for ohm-to-temperature chart.
- k. Check system pressure is at least 12psi.
- l. On DMix Hybrid Panel, check the configuration of Hybrid water valves (open or closed properly for hi-temp water supply operation).

Please contact Watts Radiant with any suggestions to the Trouble Shooting section, or any other section, of this manual.

**GeoThermal Panel not operating correctly.**

- a. Verify circuit breaker is not tripped and 120VAC power is present at outlet.
- b. Verify 120V power connection on panel is connected to outlet and has power.
- c. Verify 1 amp fuse on relay box is not blown.
- d. Verify 24VAC transformer is functioning and 24VAC is present.
- e. Check sensor connection(s) at controller and all operational functions are set properly (see manufacturers instructions).
- f. Verify there is flow.
  1. Is the system air locked?
  2. Is the circulator running?
  3. Is 120V power present at circulator(s)?

**GeoThermal Panel running, Boiler is not firing**

- a. Verify all power and fuel connections to boiler.
- b. Check system pressure is at least 12psi.
- c. Verify there is flow.
  1. Is the system air locked?
  2. Is the circulator running?
  3. Is 120V power present at circulator(s)?

**Z Series Panel not operating correctly.**

- a. Verify circuit breaker is not tripped and 120VAC power is present at panel.
- b. Verify 120V power connection on panel is connected correctly.
- c. Verify 1 amp fuse on relay box is not blown.
- d. Verify 24VAC transformer is functioning and 24VAC is present.
- e. Check Thermostat connection at relay box and all operational functions are set properly (see manufacturers instructions).
  1. Is there is a call from the thermostat(s)?
- f. Verify there is flow.
  1. Is the system air locked?
  2. Is the circulator running (if present)?
  3. Is 120V power present at circulator(s)?

**System not heating properly but HydroNex system seems to be operating correctly.**

- a. Is boiler set up and operating correctly?
- b. Is system air locked?
- c. Is system supply water temperature too low?
  1. Change setting(s) on Mix Valve, Tekmar 361 or 256 control.

**Excessive boiler short-cycling.**

- a. Is primary circulator operating?
  1. Is there proper flow through the boiler?
  2. Are all ball valves open?
  3. Is there a wye-strainer on the boiler loop? If so, is it clogged?
- b. Is boiler set up and operating correctly?
- c. Is boiler oversized for the heating load?



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