Operation:
This panel is designed to separate the secondary system fluid from the primary system fluid by utilizing a plate heat exchanger, and is recommended for applications that use an open loop system as the heat source or in applications where a water/glycol mixture is used in the secondary heating loop.

The secondary system is filled during installation and operates as a closed loop circuit. The panel comes with an expansion tank and relief valve for the secondary side of the system. The design supply fluid temperature in the primary loop is set with a tempering valve.

The panel is operated as a single zone system by using a thermostat to activate the primary circulator. The secondary circulator operates continuously providing even heat distribution during the heat up and cool down cycles.

The panel can also be operated as a multiple zone system. The on/off valves located on the supply manifold can be fitted with optional electrical valve actuators to control individual loops in the system. In this application, every actuator is connected to a thermostat located in the area served by the loop. When the thermostat calls for heat, the actuator opens the loop allowing flow. When all loops are satisfied, the primary and secondary circulators are shut down.

Balancing valves with flow indicators on the return manifold allow the user to adjust and visually monitor the flow rate of each loop. The circulator control module contains a 24V transformer, a circulator relay, a dry contact enable, and an adjustable high limit which prevents the supply fluid from exceeding the desired temperature. Valves on the supply and return manifolds allow each loop to be isolated when necessary. The optional actuators and thermostats must be ordered separately according to project specifications.

The panel operation is controlled by closure of a 24V dry contact. An example of devices that can provide this are: two and three wire room thermostats, programmable thermostats, set point controls, indoor/outdoor reset controls, integrated building controls, etc.

<table>
<thead>
<tr>
<th>Part #</th>
<th># of outlets</th>
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<tbody>
<tr>
<td>489030</td>
<td>3 loops</td>
</tr>
<tr>
<td>489031</td>
<td>4 loops</td>
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<td>489032</td>
<td>5 loops</td>
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<tr>
<td>489033</td>
<td>6 loops</td>
</tr>
<tr>
<td>489034</td>
<td>7 loops</td>
</tr>
<tr>
<td>489035</td>
<td>8 loops</td>
</tr>
<tr>
<td>489036</td>
<td>9 loops</td>
</tr>
</tbody>
</table>
Heat exchangers (HX) function to transfer heat from one fluid to another by passing those fluids close to each other without allowing them to mix. The use of a HX allows heat to be distributed when different sections of a system require isolation or different fluids. Typical applications that require HX use are: domestic hot water isolation, pool/spa heating, and partial glycol systems. The rate of heat transfer across a HX depends on the inlet temperature and flow rate of both fluid streams, as well as the surface area separating them.

The addition of a HX creates a completely isolated secondary system. When this secondary is a closed loop, then the addition of certain components is required. Typically a circulator, air elimination device, pressure relief valve, and an expansion tank are needed.

### 3 Way thermostatic mixing (the concept)

One of the most common mixing devices used in low temperature hydronic systems is a 3-way thermostatic valve. It has two inlet ports--one for hot water, the other for cold--and a single outlet port for the mixed stream. Inside the valve is a shuttle mechanism that determines the proportions of hot and cold water allowed into the valve. The shuttle is moved up and down inside the valve body by the expansion and contraction of a wax-filled actuator. The sealed wax assembly is heated by the mixed flow across it. If the mixing stream is slightly too hot, the wax assembly expands, forcing the shuttle to partially close the hot inlet port and simultaneously open the cold inlet port.

A knob on the valve sets the actuator to the desired outlet water temperature. As the temperatures of the incoming hot and cold streams change, the wax-filled actuator moves the shuttle to maintain the set outlet water temperature.
A domestic hot water tank is often used as the heat source for a floor heating system where permitted by code. An open system uses domestic water operating under regular line pressure. All components in the primary side of the unit are non-ferrous to comply with the requirements of a potable system. When the system is used for floor warming, a slab sensor is used to control the heat input to the floor. In radiant floor heating systems the space or room temperature is generally controlled by an air sensing thermostat. Radiant floor surface temperature is influenced by the supply water temperature, it is very important to provide the calculated supply water temperature in order for the system to perform properly.

The main purpose of the water tank is to provide domestic hot water. It is generally sized to meet the domestic water demand, but may have some excess capacity. A shared water tank must be sized carefully to provide enough heat for both the domestic hot water and heating applications. If not, both the domestic water supply and the heating could be insufficient.
Conventional Boilers

The term "conventional boiler" is used to designate a hot water heat source designed for more traditional hydronic systems - baseboards, radiators and fan coils (water to air heat exchangers). These heat emitters operate on high supply water temperature and have a limited temperature drop in the circuit. The usual operating range is between 150 - 200 degF. A conventional boiler should be operating above the dew point so there is no flue gas condensation. This limits the return water temperature to 135-140 degF. However, in most cases even the supply temperature for a floor heating system is lower than this. The following diagram illustrates the use of primary/secondary piping which in most situations will elevate the return water and protect the boiler.

There are situations when primary/secondary piping alone will not protect the boiler from excessively low return water temperatures, such as start up of a high mass slab or extended periods of high heat loss (below design conditions). In these cases an additional 3 way thermostatic mixing valve may be required in the primary piping to protect the boiler. This valve should be set to a temperature compliant with the boiler manufacturer's minimum return water requirement.
When using multiple Control Panels with Heat Exchanger, they can be piped in either of the following configurations. Series piping will result in lower supply water temperature available to the subsequent panel(s). Parallel piping is preferred when supply water temperatures must be equal.

**Multiple panels connected in parallel to the primary loop**

**Multiple panels connected in series to the primary loop**
The control panel requires 110V power supplied to the circulator control module. The panel(s) should be on a dedicated electrical circuit and an external disconnect is required at the control panel.

The heat demand requires a closed dry contact which may be provided by the following devices.

**Temperature sensors**

Any of the following low voltage devices can be used to control the heat input to the panel through the circulator control module.

**Electrical inputs / outputs**

- 110V power line, neutral, ground
- Low voltage wiring
- Programmable thermostat
- Aquastat
- Capillary sensor

**Electrical Output**

The WarmRite control provides a dry contact enable.

**Wiring requirements**

- Maximum current draw: 5Amps
- Low voltage wiring from the circulator control module to device
- Dry contact enable
- Line voltage wiring from control panel to distribution panel
The unit can be operated as a multiple zone system allowing the control of each loop independently. In installations where each area requires direct thermostat control, every loop must be fitted with an electrical valve actuator. The actuators mount on the top manifold after removing the white cover caps. This application requires the use of actuators with end switches.
Steel cabinet dimensions
- Large: 42" W, 24" H, 6" D
- Large cabinet: 3 - 9 loops
- Finish: Powder coated, off white

Supply / return connection
- 1/2" NPT female

Piping connection
- 3/8", 1/2", 5/8", 3/4" XPA or PEX

**Note:** Fittings need to be ordered separately as none are provided.

Circulator
- 3-4 loops: Grundfos UP15-42F 1/25 HP
- 5-7 loops: Grundfos UP25-64F 1/12 HP
- 8-9 loops: Grundfos UP26-99F 1/6 HP

Primary circulator
- Grundfos UP15-42SF 1/25 HP

Tempering valve
- Honeywell AM102R-UT-1 CV 3.5
- Temperature: 80°F - 180°F (27°C - 82°C)

Gauge
- Temperature: 32°F - 240°F (0°C - 116°C)

Maximum primary pressure
- 115 psi
- Secondary operating pressure
- 12-30 psi

High limit range
- Factory set to: 41°F - 194°F (5°C - 90°C)
- 122°F (50°C)

Power
- 110V, 5A

Transformer
- 24V 40VA

Maximum fluid temperature
- 200°F (92°C)

Fill/drain valve
- ¾" garden hose connection

Expansion tank volume
- 1.5 USG

Expansion tank pressure
- Factory adjustable to secondary operating pressure
- 12 psi
- 30 psi

Pressure relief valve
- Field adjustable to secondary operating pressure

Loop flow rate indicator
- 0 - 1 gpm (0 - 4 l/m)

Heat exchanger
- 50,000 BTUH @ 140°F primary
- 90,000 BTUH @ 180°F primary

The control panel with heat exchanger contains:
- 3-9 loops
- Supply manifold with on/off valves
- Return manifold with balancing valves and flow rate indicators
- Tempering valve
- Circulator control module (includes 24V transformer, circulator relay, dry contact enable, and high limit)
- Primary circulator (stainless steel)
- Secondary circulator
- Expansion tank for secondary circuit
- Plate heat exchanger
- Pressure and temperature gauges
- Fill/drain valves for secondary circuit
- Pressure relief valve for secondary circuit
- Isolating valves
- Automatic air vent for secondary circuit
- Manual air vent for primary circuit
- Steel cabinet

**CONTROL PANEL with HEAT EXCHANGER specification sheet**

Canadian Customers (866) 473-9462  U.S. Customers (800) 473-9808