

Application (AIS)

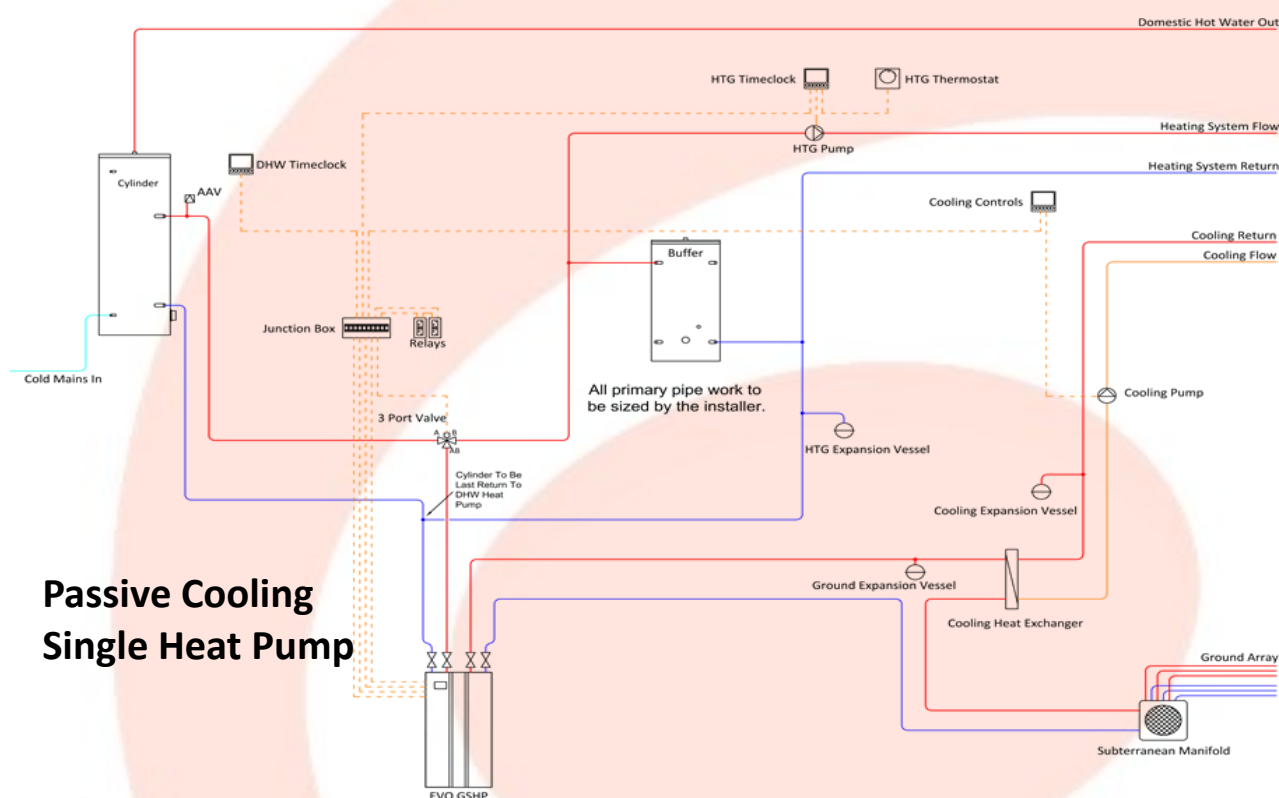
EVO Passive Cooling V1.0

Passive cooling is a design approach that focuses on heat gain control and heat dissipation in a building in order to improve the indoor thermal comfort with low energy consumption.

At the end of a heating season the ground arrays will normally be operating at around 0 to 5 °C. The amount of time for the array to return to 'normal' ground temperatures depends upon the type of array (drilled vertical ground arrays will generally remain cool for a period of time, whereas horizontal ground arrays will quickly return to the surrounding ground temperature due to a higher solar gain and especially after a period of rain). However, the ground temperature will generally be cooler than the surrounding air temperature in summer.

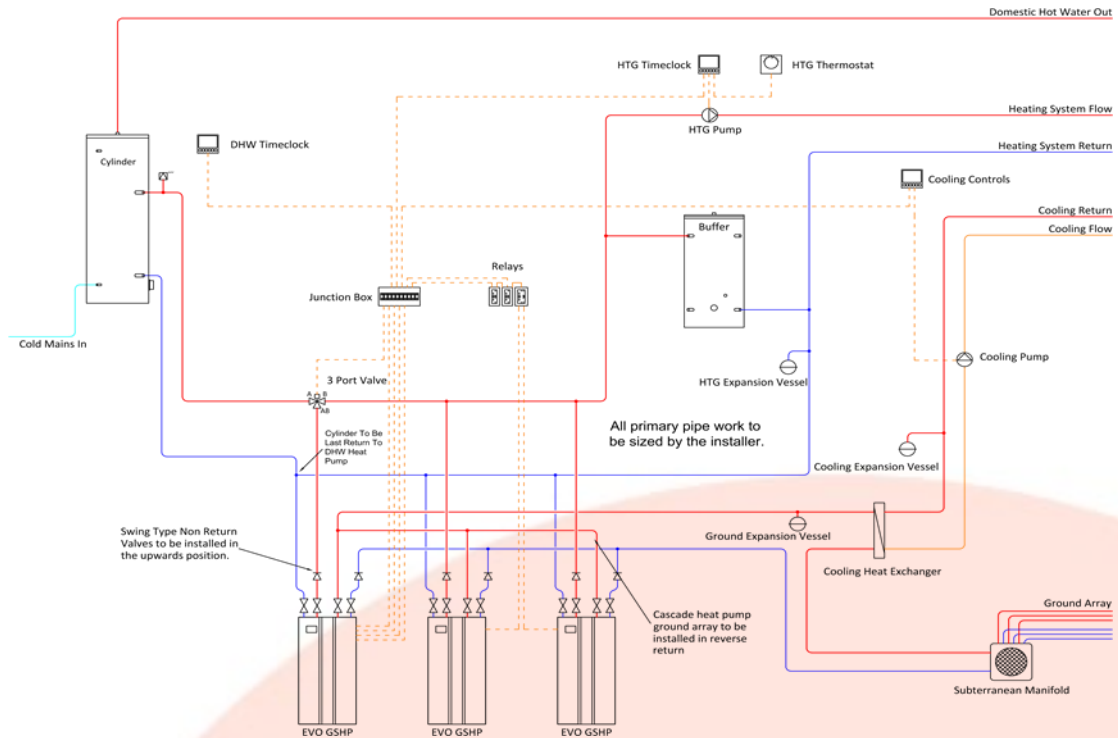
This colder temperature can allow a degree of passive or low cost comfort cooling to occur if the building has a cooling delivery system. This is simply achieved by passing the contents of the cooling system through a plate heat exchanger with the ground array fluid passing through the other side. It is important that the cooling heat exchanger is chosen appropriately so that it does not restrict the ground array flow during normal heating operation. While the fluid of the cooling system still passes through the heat pump, the heat pump is inactive and the only energy used is the power required by the water pumps and cooling system. How effective this cooling is and for how long depends upon the amount of cooling required and again the type of ground array. Whilst not as effective as active cooling, passive cooling will allow a degree of cooling at low cost.

There is a small risk of freezing the cooling heat exchanger, so glycol should be used in both circuits .





Passive Cooling Multiple Heat Pumps



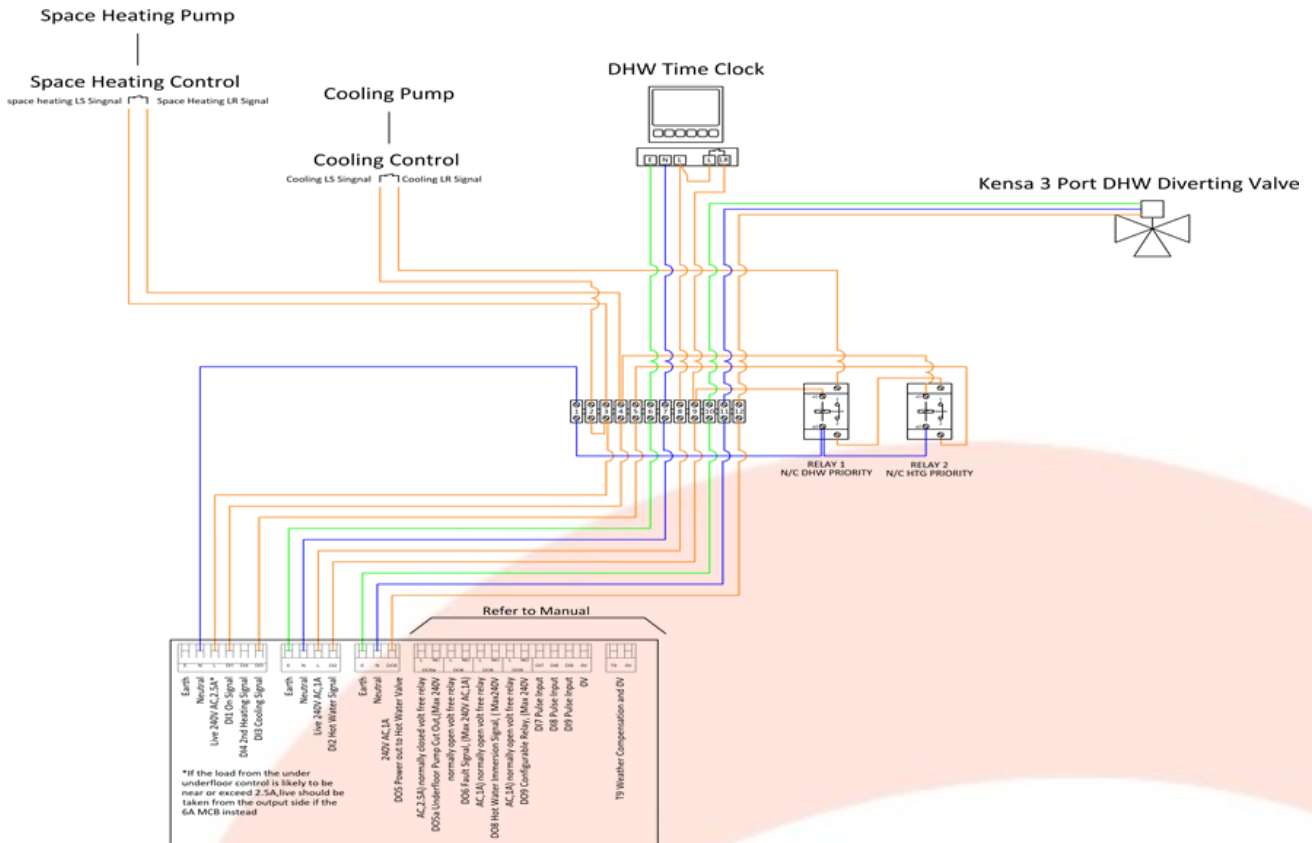
Methodology.

The ground and cooling circuits are kept hydraulically separated via an intermediate heat exchanger.

In cooling mode, the return fluid from the cooling system passes next to the ground fluid in the cooling heat exchanger. The internal ground side water pump of the EVO is controlled to circulate the ground array while in cooling mode (call signal on DI3) without the compressor running. Heat is transferred from the return of the cooling system into the flow from the ground.

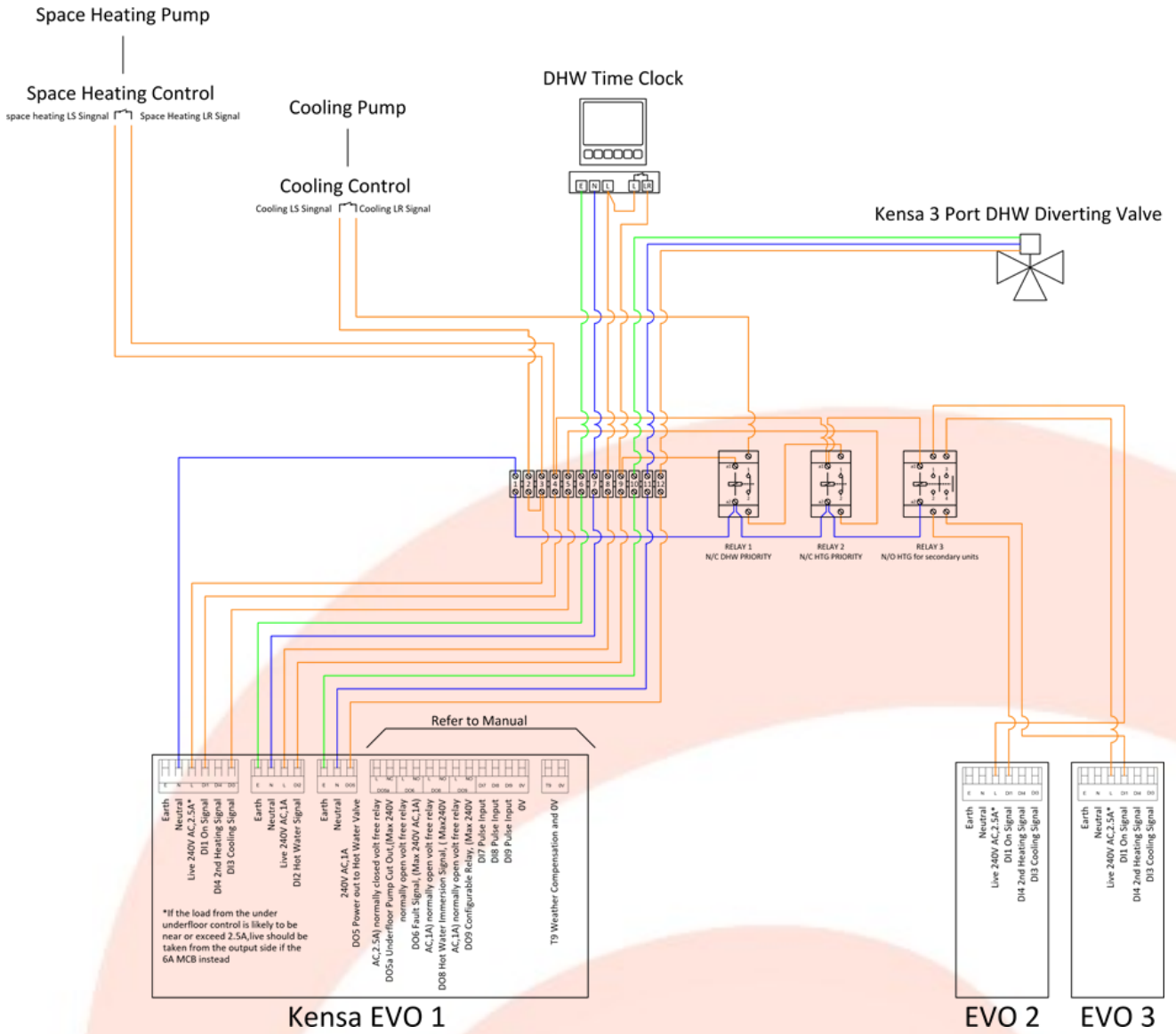


Single HP Electrical Connection





Multiple HP's Electrical Connections





Hydraulic Drawing

