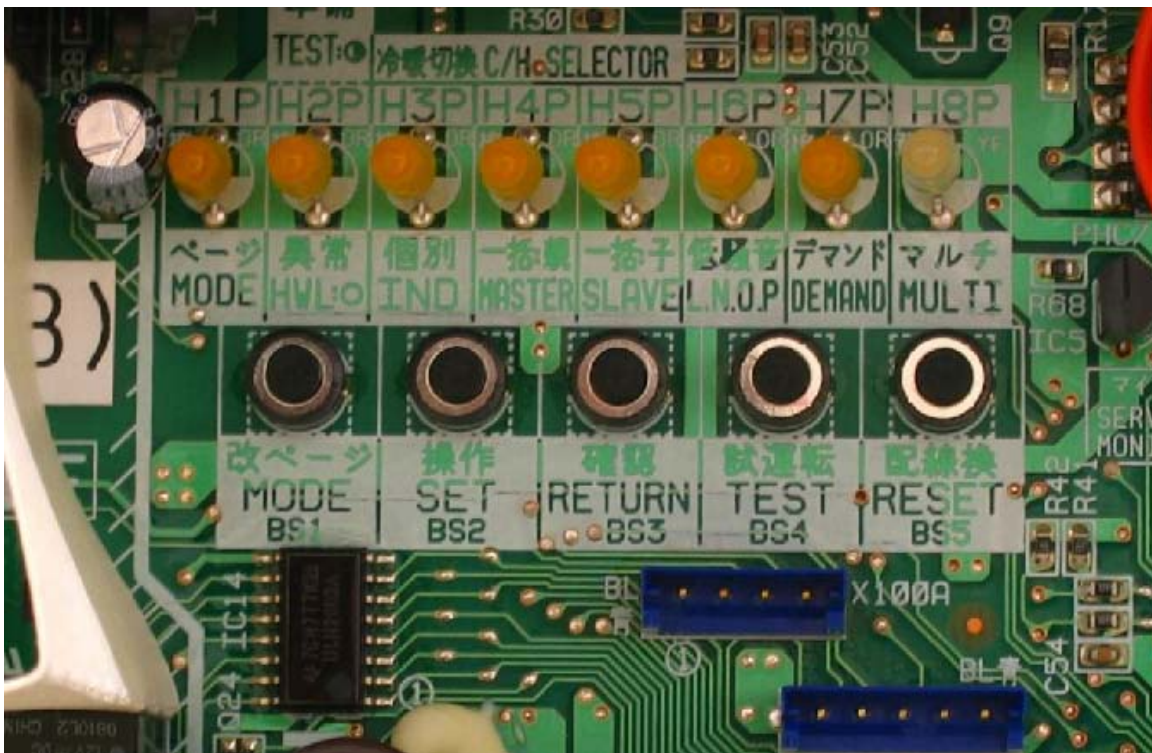


## Case Study

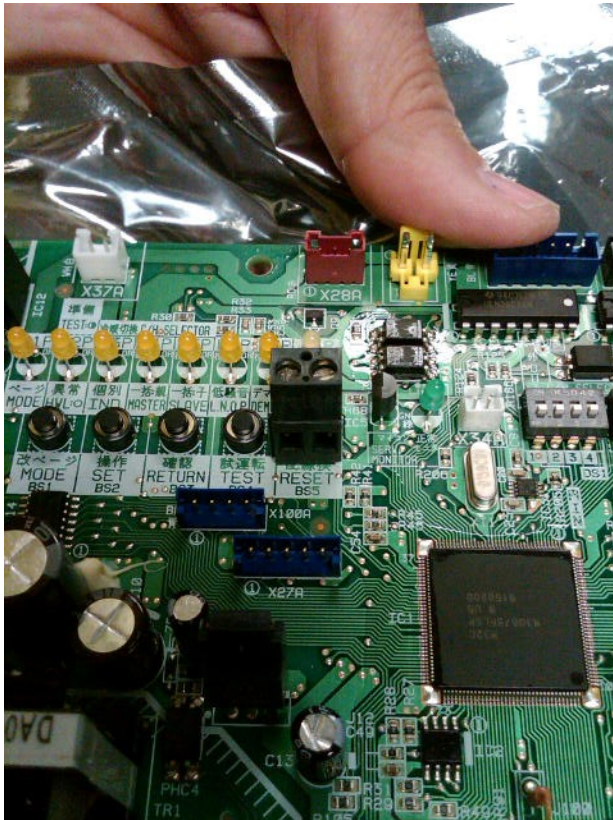
### Modification for VFR Heat Pump Controllers for Quick Restart

In the final commissioning of two key data centers for a Radiologist client it came to our attention that the restart time of the Daikin Variable Flow Refrigerant heat pumps could take as long as ten minutes to restart. The heat loads in most data centers, including this one, only allow two to three minutes for the cooling to be off before the high temperature jeopardizes the computer equipment. While the manufacturers marketing literature promoted the use of these units in data center and computer room environments, they refused to make any modifications to the factory control sequence to make a quicker restart time. Without a solution, the cooling systems in these facilities would be useless. The following case study describes how Hunt Engineering efficiently solved this problem.

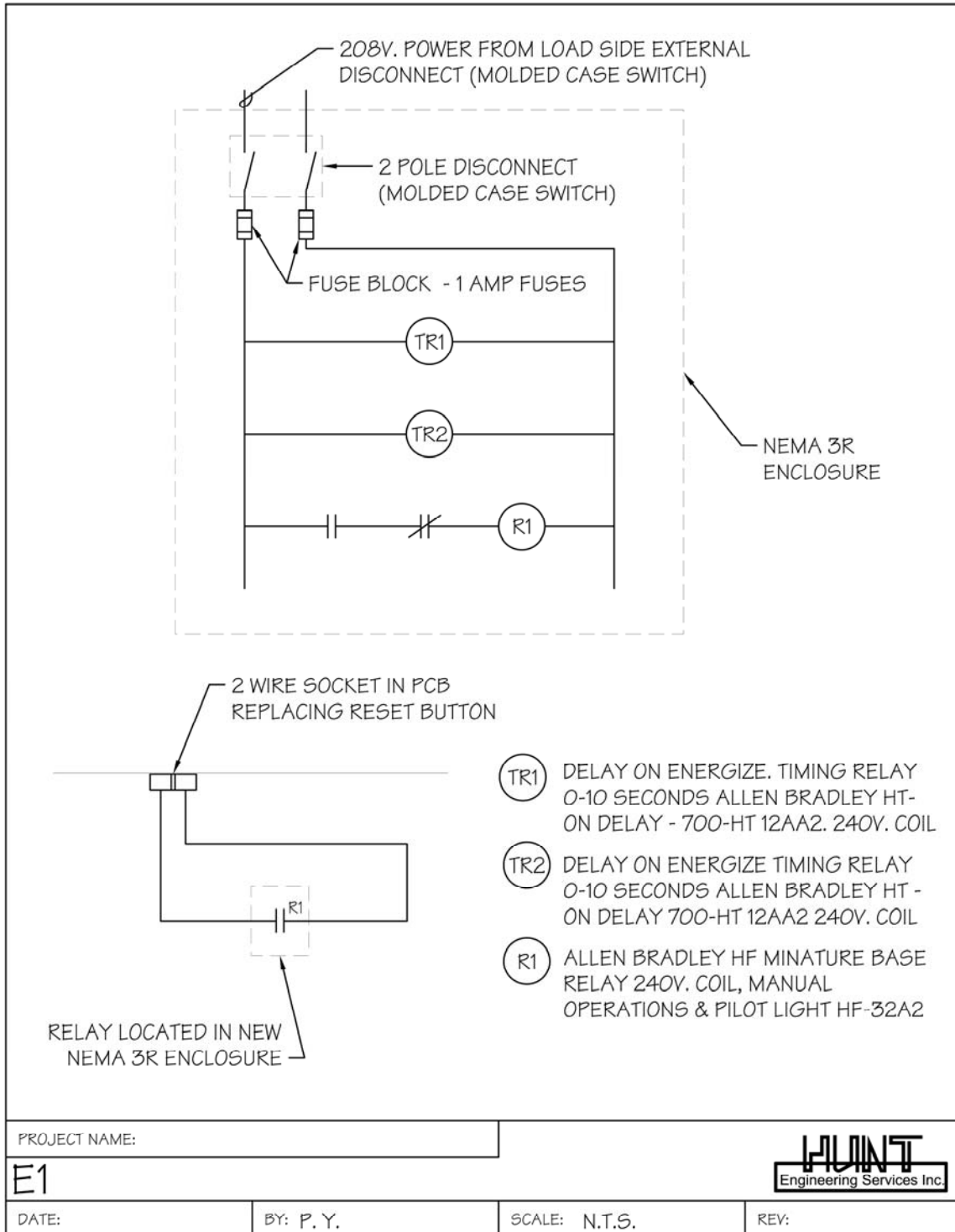
- 1) Pictured is original control card with 208 voltage operating on the circuit cards. Industrial control cards of this type require specialized service and are constructed differently than your typical personal computer circuit card because of the higher voltage.



- 2) Hunt Engineering designed the replacement of the manual service reset button with a two wire socket, and the extension of this wiring to an automatic restart controller. We worked with an industrial control card repair shop that did the modifications to the control card.



- 3) Hunt Engineering designed an automatic restart controller with timing relays to mimic the operation of the manual push button we replaced.



4) The industrial repair shop also built the custom controller from our drawing.



5) With the modification made to the controls, the cooling system was able to be fully utilized as intended in the original design, with a restart that is within about 2 minutes.



The final design allowed the indoor fan coil units and the outdoor variable flow refrigerant units to provide a high level of cooling for the data center. The energy savings of the variable flow heat pump system is realized, along with redundant system design.



End of Case Study.