Abstract:

Power dissipated as heat from two electrical components used in FutureTruck, the Motor Controller and DC-DC Converter Module’s, require 30 kilowatts and 300 watts respectively to be cooled. An inline electric remote pump is used to pump water at ambient temperature to heatsinks attached to both the Motor Controller and DC-DC Converter. Water is pumped at 2 gallons per minute with a pressure of 10 psi. 5/8-inch heater hose is used throughout the loop located on the passenger side of the body frame of the truck. From the manufacturer’s specifications, the Motor Controller included a heatsink that requires 2 gallons per minute of ambient water, with no more than 17 psi provided to pump the water. From the manufacturer’s specifications, the DC-DC converter’s baseplate temperature was not to exceed 100°C, with this cooling loop, the baseplate temperature could reach a maximum of 90°C. Sufficient cooling was provided for both electrical components.
Figure 4: Cooling system schematic