

PERFORMANCE CHARACTERIZATION OF THE TRW 35K PULSE TUBE COOLER, D. L. Johnson, G. T. Smedley, S. A. Collins, and R. G. Ross, Jr., Jet Propulsion Laboratory, California Institute of Technology, Pasadena, CA 91109- The TRW 35K Pulse Tube Cooler is configured as an integral cooler, with the pulse tube attached perpendicular to a pair of compressors operating into a common compression chamber. The cooler was extensively characterized by JPL, measuring the thermal performance and the cooler-generated vibration and EMI as a function of the piston stroke and offset position, drive frequency, and the heat sink temperature. The cooler was optimized for 35-K operation, and has a nominal cooling capacity of 850 mW of cooling at 35 K for a cooler input power of 200 W. The cooler also provides 2 W of cooling at 60 K for 90 W of input power. The thermal performance was found to be quite sensitive to drive frequency and piston offset position. The pulse tube parasitic conduction levels were also measured, and shown to have a strong angular orientation dependence relative to gravity. Magnetic shielding studies were performed to examine the radiated magnetic emission levels from the compressors with respect to the shielding geometry and thickness. The results of the parametric studies will be presented.

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Small and Large Scale Refrigeration

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