



Design and Off-Design Performance of 100 kWe-Class Brayton Power Conversion Systems

By -

Bibliogov, United States, 2013. Paperback. Book Condition: New. 246 x 189 mm. Language: English . Brand New Book ***** Print on Demand *****.The NASA Glenn Research Center in-house computer model Closed Cycle Engine Program (CCEP) was used to explore the design trade space and off-design performance characteristics of 100 kWe-class recuperated Closed Brayton Cycle (CBC) power conversion systems. Input variables for a potential design point included the number of operating units (1, 2, 4), cycle peak pressure (0.5, 1, 2 MPa), and turbo-alternator shaft speed (30, 45, 60 kRPM). The design point analysis assumed a fixed turbine inlet temperature (1150 K), compressor inlet temperature (400 K), helium-xenon working-fluid molecular weight (40 g/mol), compressor pressure ratio (2.0), recuperator effectiveness (0.95), and a Sodium-Potassium (NaK) pumped-loop radiator. The design point options were compared on the basis of thermal input power, radiator area, and mass. For a nominal design point with defined Brayton components and radiator area, off-design cases were examined by reducing turbine inlet temperature (as low as 900 K), reducing shaft speed (as low as 50 percent of nominal), and circulating a percentage (up to 20 percent) of the compressor exit flow back to the gas cooler. The off-design examination sought...



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