

FPA 적외선 센서 냉각용 스텔링 극저온 냉동기 개발

박성제[†] · 홍용주* · 김효봉*(한국기계연구원) · 김양훈**(부산대)

Development of the Integral Stirling cryocooler for cooling of the FPA

SeongJe Park, YongJu Hong, HyoBong Kim, YangHun Kim

Key Words: Focal Plane Array(FPA, 초점면배열), Stirling cryocooler(스텔링 극저온 냉동기)

Abstract : Stirling cryocoolers have been widely used for the cooling of infrared sensors and high temperature superconducting filters to the temperature of the liquid nitrogen. The Stirling cryocooler with the rotary compressor is applicable to the cooling device for the compact mobile thermal imaging system, because the refrigerators have the compact structure and light weight. In this paper, integral Stirling cryocooler is designed, manufactured and fabricated, and performance characteristics are investigated. This cooler delivers approximately 0.6W cooling at 80K for 21W of input power from 24V DC power supply.

평판형 증발부를 갖는 루프히트파이프의 시동 특성에 관한 실험적 연구

정의국[†](한국항공대) · 부준홍*(한국항공대)

An Experimental Study on the Start-up Characteristics of a Loop Heat Pipe with Flat Evaporator

Eui Guk, Jung and Joon Hong Boo

Key Words: Loop Heat Pipe(루프히트파이프), Flat Evaporator(평판형 증발부), Polypropylene Wick(폴리프로필렌 워), Start-up Characteristics(시동특성)

Abstract : The start-up characteristics of a loop heat pipe with flat evaporator was investigated experimentally. It is common for loop heat pipes to experience start-up problems under low thermal loads. This study employed a bypass line attached to the evaporator to alleviate the difficulties associated with startup. The heating area was 35 mm x 35 mm and axial grooves were provided in the flat evaporator (40 by 50 mm) to serve as a vapor passage. The size of condenser was 40 mm (W) x 50 mm (L) in which ten coolant paths were provided. The inner diameters of liquid and vapor transport lines were 2.0mm and 4.0 mm, respectively and the length of the two lines was 0.5 m each. The thermal load range was up to 90 W using methanol as a working fluid.