DEVELOPMENT OF DUAL AXIS MICROTRACKING SYSTEM FOR CONCENTRATOR PHOTOVOLTAIC

Masakazu Nakatani 1,2, Noboru Yamada 2

1 Sun Marion Co., Ltd., Nagaoka, Japan 940-2127, nakatani@sun-marion.com
2 Nagaoka University of Technology, Nagaoka, Japan 940-2188

Concentrator photovoltaic (CPV) is a photovoltaic technology to realize the highest conversion efficiency from direct sunlight to electricity. A high concentration CPV module can achieve 36% efficiency for direct solar radiation1. CPV needs a solar tracking system to keep facing to the sun. The problem seems to lie in the fact that the conventional solar tracking system is large and heavy; tracker cost and construction cost tend to be high; and it is difficult to make a dense array. In order to solve these problems, compact microtracking systems, in which tracking mechanism is integrated into the CPV module, have been recently studied2. To realise such a microtracking system, light weight and low-cost mechanism design to synchronously drive numerous micro CPV lens-cell units. In this paper, we introduce a practical microtracking system with a unique tracking mechanism. Low height and light weight feature of the present system enables easy transportation, mounting, and low-cost construction. The present system can be mounted on a horizontal or a tilted fixed plane in the same way as the conventional flat plate photovoltaic modules. Figure 1 shows a prototype microtracking system on which multiple CPV lens-cell units are integrated. Experimental results show that the prototype system can synchronously drive the CPV lens-cell units with tracking angle error less than 1 degree.

Figure 1: Photograph of a prototype 2-axis microtracking system for CPV