

## MPPT ALGORITHM USING DECREMENTED WINDOW-SCANNING METHOD FOR HOME SCALE PHOTOVOLTAIC-BASED POWER SUPPLY SYSTEMS

FAIZAL ARYA SAMMAN<sup>1,\*</sup>, TINO SUHAEBRI<sup>2</sup>, RHIZA SAMSOE' OED SADJAD<sup>1</sup>  
ANDI EJAH UMRAENI SALAM<sup>1</sup>, ANDANI ACHMAD<sup>1</sup> AND CARMADI MACHBUB<sup>3</sup>

<sup>1</sup>Department of Electrical Engineering  
Universitas Hasanuddin

Jl. Poros Malino Km. 6, Bontomarannu 92171, South Sulawesi, Indonesia

\*Corresponding author: faizalas@unhas.ac.id

<sup>2</sup>Department of Electrical and Installation Engineering

Akademi Komunitas Industri Manufaktur Bantaeng

Pa'jukukang, Nipa-Nipa, Bantaeng 92461, South Sulawesi, Indonesia

<sup>3</sup>School of Electrical Engineering and Informatics

Institut Teknologi Bandung (ITB)

Jl. Ganesha No. 10, Bandung 40132, West Java, Indonesia

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**ABSTRACT.** *This paper presents a hardware implementation of a novel method to operate a photovoltaic-based electric power system at its maximum power point. A maximum power point tracing (MPPT) algorithm named decremented window-scanning (DWS) is proposed and validated in real experiments. The scanning process operates based on perturbing signal with variable duty ratios of the pulse-width modulated signal applied to a DC-DC converter circuit in the MPPT module. The characteristic of the proposed MPPT algorithm is its simplicity to implement on a microcontroller device. It consumes 11,518 bytes memory, or 37% of total 30,720 byte available memory slots in the microcontroller. The MPPT algorithm is tested using 100Wp photovoltaic (PV) panel under three different partial shading conditions. The experimental results show that the MPPT unit can find the expected duty ratios that can turn the PV unit to operate at its maximum power points.*

**Keywords:** Maximum power point tracing (MPPT) algorithm, Power electronics, Scanning-based MPPT algorithm, Photovoltaic systems, Decrement window-scanning

1. **Introduction.** Environment issue is one of main factors to accelerate the optimal uses of renewable energies. Wind energy, fuel cell, photovoltaic and thermoelectric generator are promising technologies that can potentially replace the use of fossil fuel energies. To make use of renewable energies, an appropriate power system generation is required. According to the power generation volume, renewable energy-based (RE-based) power system generation can be classified into large scale, medium scale, small scale and micro scale power system generation. Home scale RE-based power system generation can be classified into the micro scale system. A house locally powered by renewable energies, such as photovoltaic energy, or renown as an energy autonomy house, will be a trending issue in the future.

This paper discusses an issue in home scale renewable energy-based power system generation, which is based on hybrid photovoltaic-grid power supply system. The hybrid system is shown in Figure 1. The system consists of an MPPT module, which is the main