

DEVELOPMENT OF A DYNAMIC AC/DC (HYBRID) ELECTRIC POWER DISTRIBUTION BOARD

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ABSTRACT

The lack of utility power supply in Nigeria for many hours on daily basis has made individuals and organizations seek alternative power supplies in form of generating sets and solar system. A solar photovoltaic (PV) system can be utilised to supply DC power to low power-consuming devices such as lamps in a building while other devices are AC-operated. Utilising AC power and DC in the same building requires a mains distribution fuse board to distribute AC and DC power simultaneously. An AC/DC distribution fuse board has been designed to have two power inputs: 220 V mains supplying an 8-way set of circuit breakers protected by a 60 A MCB and a 12 V DC from solar PV system protected by DC circuit breakers. The consumer unit has a rectification section where 220 V AC is converted to 12 V DC to supply power to a DC illumination system. An automatic selection of DC supply to the lighting circuits was provided with a 220 V, 10 A, AC relay. When mains is available, it supplies power to the lighting circuits and all other AC devices and when not available, the PV system takes over the supply to the lighting circuits only.

KEYWORDS: *AC/DC Consumer Unit, DC Illumination System, LED Lamps, Power Failure, Solar Photovoltaic System*

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