DESIGN, CONSTRUCTION AND TESTING OF A THREE-PHASE LOW VOLTAGE POWER SUPPLY

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ABSTRACT

This study aimed to design, construct and test a Three-Phase Low Voltage Variable Power Supply for EE/ECE Laboratory with the following component: three-phase high voltage power supply of 220VAC, low voltage variable three-phase AC power supply with an output of 3V, 4.5V, 6V, 9V, 12V and DC output of ±12V, ±5V, ±1.25V – ±12V. All output except 220VAC are provided with over current circuit protection to protect the circuit and the component from overload and accidental short circuit. The power supply was tested and evaluated at the EE/ECE Laboratory (Electronics Lab). The parameters tested are the phase angle, (for AC output voltage only), output voltage, and maximum load current for both DC and AC output. In testing the power supply, it requires source voltage of 220VAC and the actual testing, the supply voltage are 210.8V, 211.5V, and 211.3V for phase 1, phase 2 and phase 3, respectively. This value is lower compared to the required voltage base on the design, yet this value are tolerable and can be used for testing and evaluation with a minimal amount of deviation from the expected value. The regulated DC power supply output voltage is within a tolerable limit regardless of the source voltage changes to the acceptable level from 200V to 240V.

The load current of 0.6A for AC and 0.7A for DC is more than enough for the required laboratory experiment, because the laboratory experiment was design not only for low current normally from 10mA – 500mA. The resulting phase angle are close to 120

degrees for each phase , shown in Table 5, this is only shows that the line are balance when we test the power supply. Take note that the phasing of the three phase low voltage power supply depend on the source voltage.

After testing the power supply, the result shows that all data have met the requirements with an acceptable amount of percent of error and therefore the design is valid, reliable and accurate and the designers can conclude that this power supply was satisfactorily made and very adoptable to the needs of the EE/ECE Laboratory.