

SEKOLAH KEJURUTERAAN ELEKTRIK

Nama Matapelajaran: Makmal Tahun 3	Semakan : 3
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UTM
UNIVERSITI TEKNOLOGI MALAYSIA

SKEE 3742

**SEKOLAH KEJURUTERAAN ELEKTRIK
FAKULTI KEJURUTERAAN
UNIVERSITI TEKNOLOGI MALAYSIA**

**POWER ELECTRONICS LABORATORY
PROBLEM PACK**

Single-Phase PWM Inverter

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Project Introduction:

Inverter is a static circuit that convert power from a dc source to ac power at specified output voltage and frequency. Inverters are used in many industrial applications i.e. solar photovoltaic (PV) system, AC motor and Uninterruptible Power Supply (UPS). The power sources of the inverter may come from batteries, fuel cells, solar PV, utility-rectifier etc. The circuit can be built using power switching devices such as IGBT, MOSFET, BJT etc. Power rating of an inverter can be in the range from milliwatt to megawatt, depending on the applications. The quality of the waveform generated by the inverter circuit depends on the switching techniques. Numerous techniques are available such as square wave, quasi-square wave, pulse width modulation techniques (PWM) etc.

Project tasks:

The team is required to design and construct a PWM inverter circuit. The circuit is able to generate a pure sinusoidal voltage output from a dc input source. The output voltage total harmonics distortion (THD) should be less than 5% (IEEE standards). The power circuit is constructed from four modules of 735-346, it is a single 1kV/ 10 A IGBT device. The modules need to be connected to form a single-phase full bridge inverter circuit. The PWM module 735-341 will be used as the signal generator. The signal is required to control the switching of the IGBTs. To obtain a clean sinusoidal voltage output, you need to connect the output of the inverter through a low pass L-C filter. Observe the total harmonics distortion (THD) of the output voltage before and after filtering.

The power inverter specifications are as follows:

No.	Parameter	Value
1.	DC input voltage	30 V
2.	Resistance load	33 Ω
3.	Fundamental output voltage	24 V _{rms}
4.	Output voltage frequency	50 Hz

An industrial report supported with the experimental results is expected to be produced at the end of project time. The collected data, analysis and plots of waveforms should be well presented and discussed in detail in the report.