

## Experiment No :7

# Simulation of three phase fully controlled Rectifier with R, RL and RLE Loads

### Aim:

To simulate a 3 phase fully controlled rectifier circuit with R load, RL Load and RLE load using MATLAB

### Procedure

1. Set up a circuit to simulate as per circuit diagram
2. Connect the pulse generator with gate terminal of all thyristors
3. Set the 3 phase voltage  $440\sqrt{2}$  V
4. Write value of  $\alpha$  in command window of MATLAB, run the simulation
4. Check the input voltage, output voltage and output current wave forms

### Circuit Diagram

#### a) 3 Phase rectifier with R Load

##### Circuit diagram

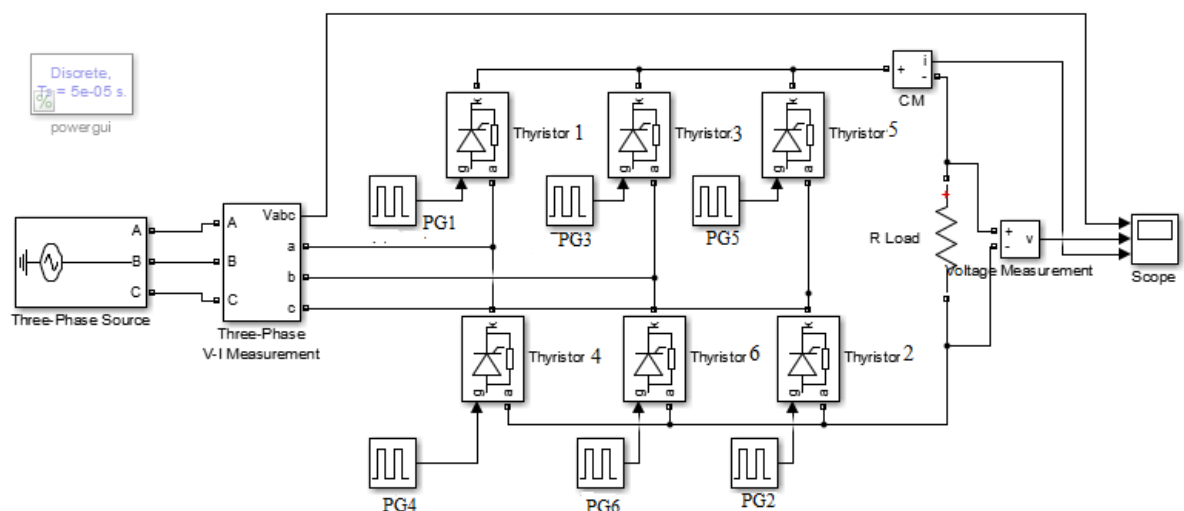


Figure 14.1 Simulation Circuit Diagram of 3 ph rectifier with R load

Select  $\alpha=30$ ,

$PG1=\alpha*0.02/360$ ,

$PG3=(120+\alpha)*0.02/360$ ,

$PG5=(240+\alpha)*0.02/360$

$$PG4=(180+a)*0.02/360,$$

$$PG6=(300+a)*0.02/360,$$

$$PG2=(420+a)*0.02/360 \text{ OR } (60+a)*0.02/360$$

### Sample Wave forms

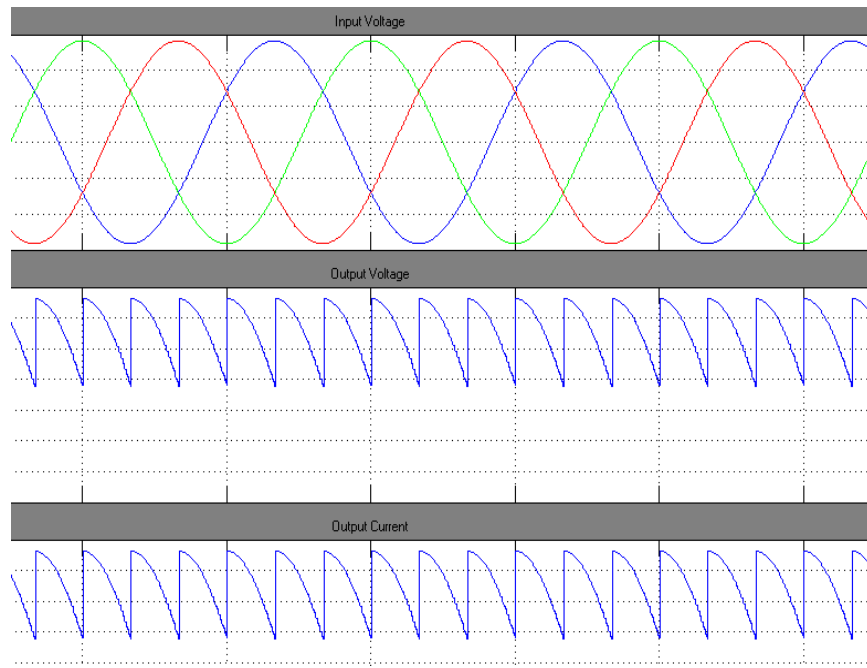


Figure 14.2 Waveform of 3 ph rectifier with R load

### b) 3 Phase rectifier with RL Load

### Circuit diagram

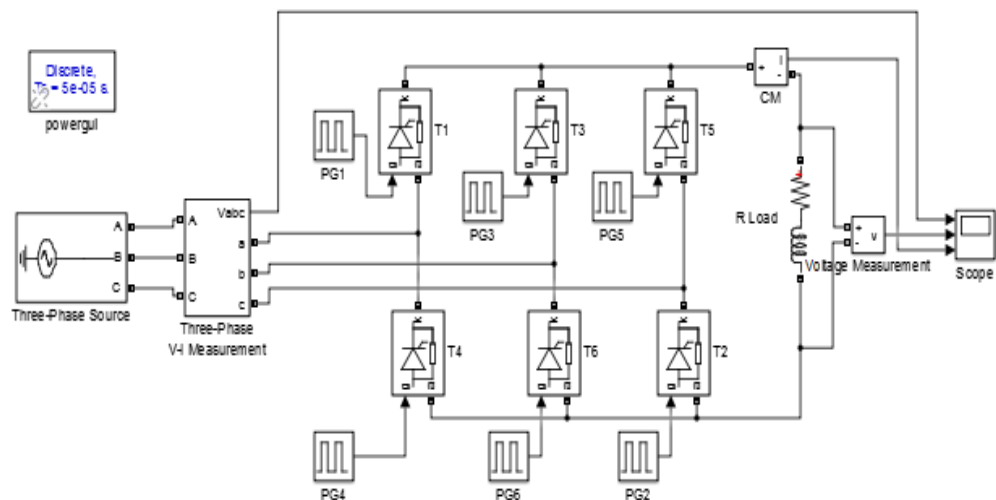


Figure 14.3 Simulation Circuit Diagram of 3 ph rectifier with RL load

Select  $a=60$ ,

$$PG1=a*0.02/360,$$

$$PG3=(120+a)*0.02/360,$$

$PG5=(240+a)*0.02/360$   
 $PG4=(180+a)*0.02/360,$   
 $PG6=(300+a)*0.02/360,$   
 $PG2=(420+a)*0.02/360$  OR  $(60+a)*0.02/360$

### Sample Wave forms

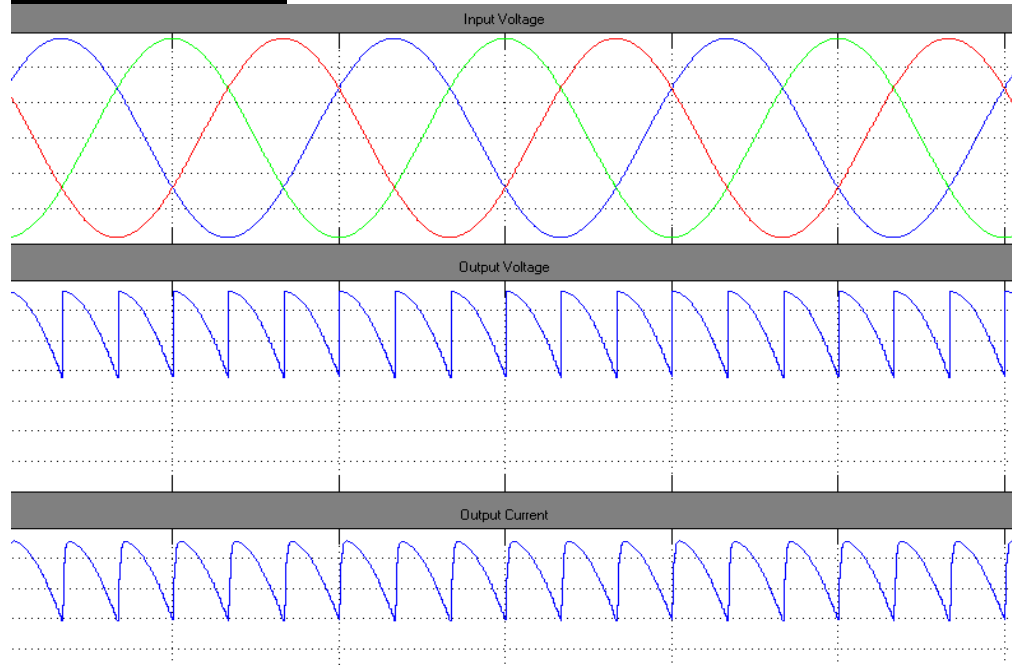


Figure 14.4 Waveform of 3 ph rectifier with RL load

### c) 3 Phase rectifier with RLE Load

#### Circuit Diagram

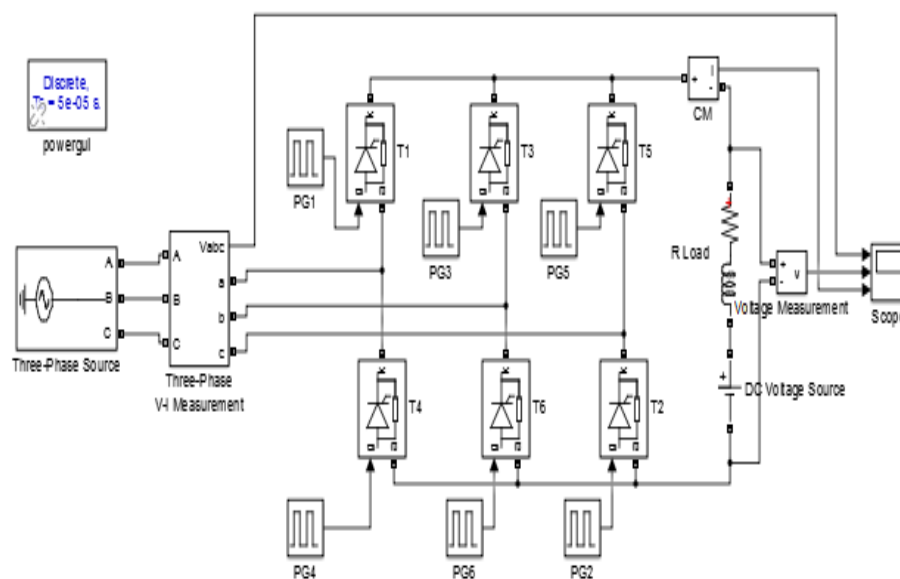


Figure 14.5 Simulation Circuit Diagram of 3 ph rectifier with RLE load

Select  $a=60$ ,  
 $PG1=a*0.02/360$ ,  
 $PG3=(120+a)*0.02/360$ ,  
 $PG5=(240+a)*0.02/360$   
 $PG4=(180+a)*0.02/360$ ,  
 $PG6=(300+a)*0.02/360$ ,  
 $PG2=(420+a)*0.02/360$  OR  $(60+a)*0.02/360$

### Sample Wave forms

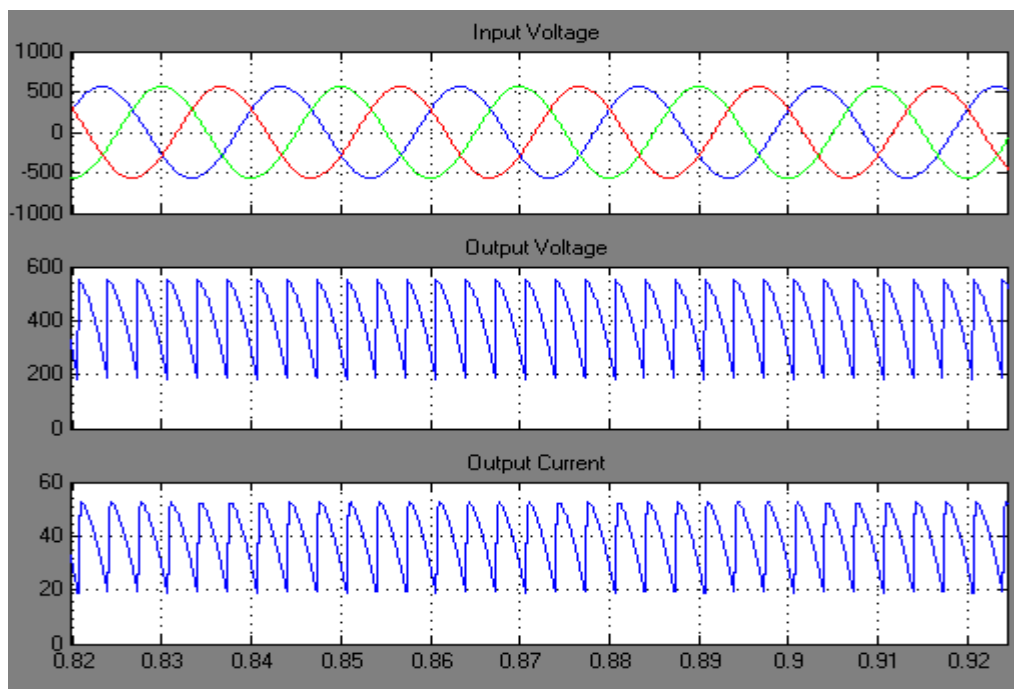


Figure 14.6 Waveform of 3 ph rectifier with RLE load

### **Result**

Simulated 3 phase rectifier for different loads and output waveforms are plotted.