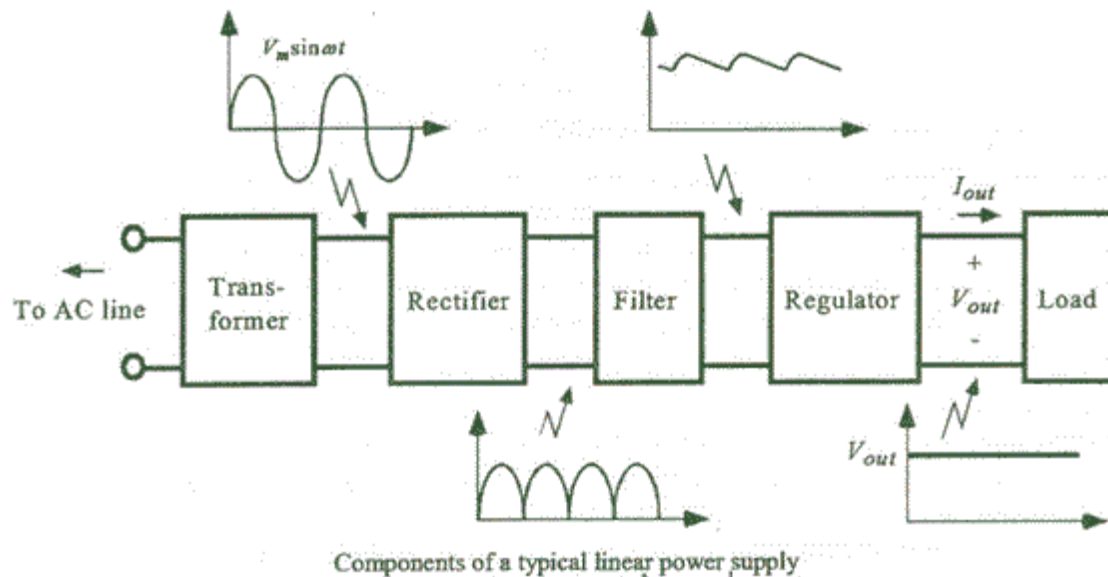
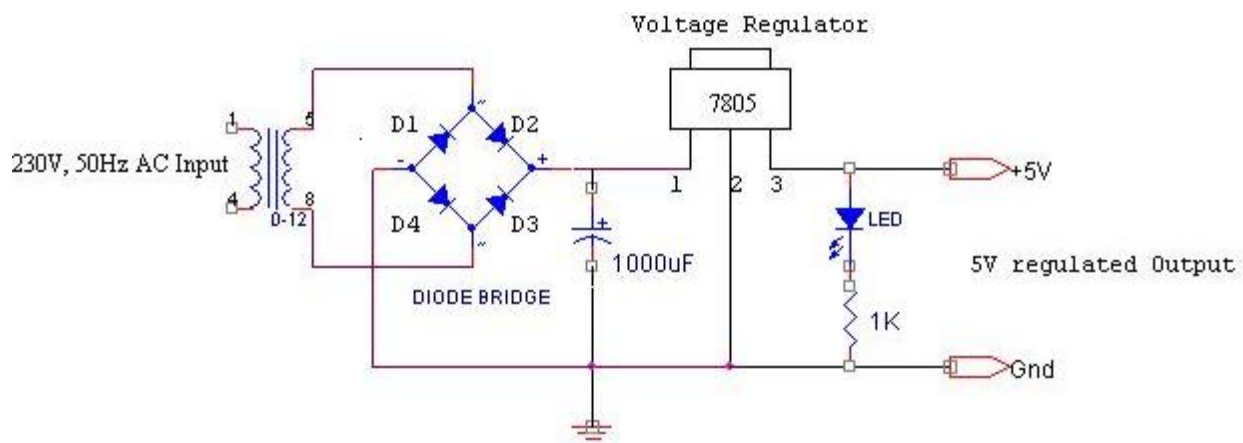


REGULATED POWER SUPPLY

BLOCK DIAGRAM



SCHEMATIC



*FOR INTERNAL CIRCULATION AND TRAINING PURPOSES ONLY

THE BASIC BLOCKS OF A REGULATED DC POWER SUPPLY ARE AS FOLLOWS:

- 1. A STEP DOWN TRANSFORMER**
- 2. A RECTIFIER**
- 3. A DC FILTER**
- 4. A REGULATOR**

OPERATION OF REGULATED POWER SUPPLY

STEP DOWN TRANSFORMER

A step down transformer will step down the voltage from the ac mains to the required voltage level. The turn's ratio of the transformer is so adjusted such as to obtain the required voltage value. The output of the transformer is given as an input to the rectifier circuit.

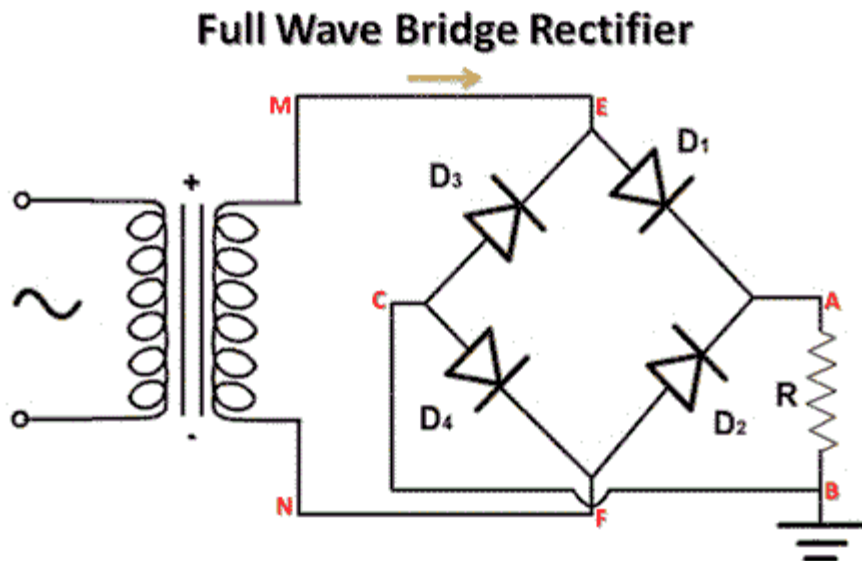
RECTIFICATION

Rectifier is an electronic circuit consisting of diodes which carries out the rectification process. Rectification is the process of converting an alternating voltage or current into corresponding direct (dc) quantity. The input to a rectifier is ac whereas its output is unidirectional pulsating dc. Usually a full wave rectifier or a bridge rectifier is used to rectify both the half cycles of the ac supply (full wave rectification). Figure below shows a full wave bridge rectifier.

*FOR INTERNAL CIRCULATION AND TRAINING PURPOSES ONLY

WEB: www.techgraylogix.com
Email: info@techgraylogix.com
Phone 0824-2414123, +919986873312

Tech-GrayLogix
First floor, Sanrita Building
Marnamikatte circle, Mangalore-575001
INDIA



A bridge rectifier consists of four p-n junction diodes connected in the above shown manner. In the positive half cycle of the supply the voltage induced across the secondary of the electrical transformer i.e. V_{MN} is positive. Therefore point E is positive with respect to F. Hence, diodes D_3 and D_2 are reversed biased and diodes D_1 and D_4 are forward biased. The diode D_3 and D_2 will act as open switches (practically there is some voltage drop) and diodes D_1 and D_4 will act as closed switches and will start conducting. Hence a rectified waveform appears at the output of the rectifier as shown in the first figure. When voltage induced in secondary i.e. V_{MN} is negative than D_3 and D_2 are forward biased with the other two reversed biased and a positive voltage appears at the input of the filter.

DC FILTERATION

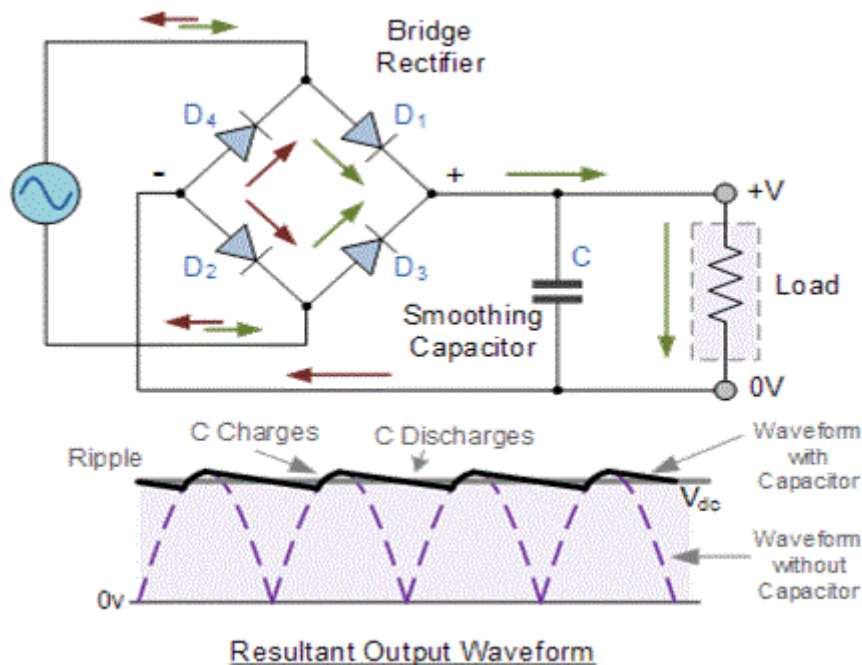
The rectified voltage from the rectifier is a pulsating dc voltage having very high ripple content. But this is not we want, we want a pure ripple free dc waveform. Hence a filter is used. Different types of filters are used such as capacitor filter, LC filter, Choke input filter, π type filter. Figure

*FOR INTERNAL CIRCULATION AND TRAINING PURPOSES ONLY

WEB: www.techgraylogix.com
Email: info@techgraylogix.com
Phone 0824-2414123, +919986873312

Tech-GrayLogix
First floor, Sanrita Building
Marnamikatte circle, Mangalore-575001
INDIA

below shows a capacitor filter connected along the output of the rectifier and the resultant output waveform.



As the instantaneous voltage starts increasing the capacitor charges, it charges till the waveform reaches its peak value. When the instantaneous value starts reducing the capacitor starts discharging exponentially and slowly through the load (input of the regulator in this case). Hence, an almost constant dc value having very less ripple content is obtained.

REGULATION

This is the last block in a regulated DC power supply. The output voltage or current will change or fluctuate when there is change in the input from ac mains or due to change in load current at the output of the regulated power supply or due to other factors like temperature changes. This problem can be eliminated by using a regulator. A regulator will maintain the output constant

*FOR INTERNAL CIRCULATION AND TRAINING PURPOSES ONLY

WEB: www.techgraylogix.com
Email: info@techgraylogix.com
Phone 0824-2414123, +919986873312

Tech-GrayLogix
First floor, Sanrita Building
Marnamikatte circle, Mangalore-575001
INDIA

even when changes at the input or any other changes occur. Transistor series regulator, Fixed and variable IC regulators or a zener diode operated in the zener region can be used depending on their applications. IC's like 78XX and 79XX are used to obtained fixed values of voltages at the output. With IC's like LM 317 and 723 etc we can adjust the output voltage to a required constant value.

APPLICATION OF REGULATED POWER SUPPLY

Regulated power supply is the main component of electrical, electronics and as well as automation equipment. Mobile phone charger, oscillator, amplifier are needed the regulated power supply

*FOR INTERNAL CIRCULATION AND TRAINING PURPOSES ONLY

WEB: www.techgraylogix.com
Email: info@techgraylogix.com
Phone 0824-2414123, +919986873312

Tech-GrayLogix
First floor, Sanrita Building
Marnamikatte circle, Mangalore-575001
INDIA