Vision of the Department

To produce skilled diploma electrical Engineers with high-quality technical knowledge and ethical values to meet the needs of industry and society.

Mission of the Department

M1- To provide a conducive environment that enhances the technical knowledge of the students by furnishing well-equipped modern electrical laboratories guided by highly experienced faculty members and different industrial visits.

M2- To improve leadership quality, managerial skills, social awareness, and responsibility towards the environment through different curricular and co-curricular activities.

M3- To give guidance and counseling to students for the growth of social ethics involves helping them develop a strong sense of responsibility, empathy, and respect for others. Aim :- Study of VI characteristics of SCR.

PROGRAM OUTCOMES (POs)

PO-1: Basic and Discipline specific knowledge: Apply knowledge of basic mathematics, science and engineering fundamentals and engineering specialization to solve the engineering problems.

PO-2: Problem analysis: Identify and analyse well-defined engineering problems using codified standard methods.

PO-3: Design/ development of solutions: Design solutions for well-defined technical problems and assist with the design of systems components or processes to meet specified needs.

PO-4: Engineering Tools, Experimentation and Testing: Apply modern engineering tools and appropriate technique to conduct standard tests and measurements.

PO-5: Engineering practices for society, sustainability and environment: Apply appropriate technology in context of society, sustainability, environment and ethical practices.

PO-6: Project Management: Use engineering management principles individually, as a team member or a leader to manage projects and effectively communicate about well-defined

engineering activities.

PO-7: Life-long learning: Ability to analyse individual needs and engage in updating in the context of technological changes.

PROGRAM EDUCATIONAL OBJECTIVES(PEO)

PEO-1: To have a wide range of career options in industries, government, public sectors, and related areas, providing innovative and effective solutions.

PEO-2: To establish oneself as an entrepreneur, one can contribute to research & development and pursue higher education in the Electrical engineering field.

PEO-3: To communicate efficiently & contribute societal needs & constraints into their professional endeavours including high regard for legal & ethical responsibilities.

PEO-4: To promote the awareness of green technologies by considering different environmental aspects and also be able to work in multi-disciplinary platforms for system optimization.

PROGRAM SPECIFIC OUTCOMES(PSO)

PSO 1: The implementation of basic knowledge to establish, formulate, and investigate various real-time problems of power system engineering, electrical machines, control systems, and power electronic systems.

PSO 2: The utilization of knowledge of Electrical engineering and laboratory skills for testing, operation, and maintenance of electrical systems.

PSO 3: The application of recent technologies & software for creating, and simulating different projects related to circuit designs, machine automation, house wiring, power systems, power electronics, control systems etc.

Apparatus required:-

Sl no	Item	Quantity
1	SCR characteristics trainer kit	01
2	Voltmeter (0-30v)	01
3	Ammeter (0-30 mA)	01
4	Patch cords	As per requirement

Theory :-

-An SCR is a three-terminal, three-junction, and four-layer semiconductor device that is used to perform switching functions in power circuit. SCR can be used for different applications like rectification, regulation of power and inversion, etc. Like a diode, SCR is a unidirectional device that allows the current in one direction and opposes in another direction only.

- The SCR has three pn – junctions, and four layers of p and n type semiconductors joined alternatively to get pnpn device. The three terminals are taken one from outer p-type layer called anode (A), second from the outer n type layer called cathode (K) and the third from the internal p-type layer called gate (G).

- Upon operating the SCR with gate current I_G starts The gate current IG starts flowing which can be adjusted by the resistance RG. The value of gate current will decide breakover voltage of SCR. As IG increases, breakover voltage will decrease i.e., SCR will turn on at lower and lower voltages because of gate control, the turn ON times of SCR can be controlled, i.e., why it is called as a controlled rectifier.

- In the reverse blocking state, anode is biased negative with respect to cathode The junctions J1 and J3 are reverse biased and junction J2 is forward biased, the lower junction J3 has a low breakdown voltage due to heavy doping on both the sides of it. Therefore, the reverse blocking capacity depends entirely on junction J1 is usually decided by the length of n-(n1) region.

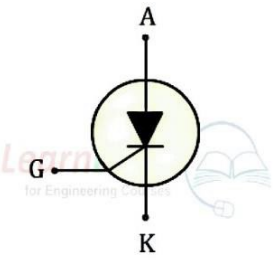
- In the forward blocking state, the thyristor has to block a forward voltage because anode is biased positive with respect to cathode, the junctions J1 and J3 are forward biased and junctions J2 is reverse biased which has to block the entire anode to cathode voltage.

-The depletion region of the reverse biased J2 junction appears in this (n1) layer. Thus deciding the forward blocking voltage.

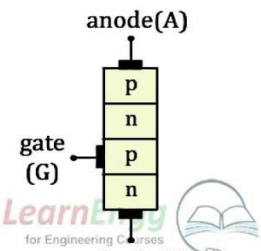
- For small reverse voltage, a small reverse leakage current flows until the avalanche break down takes place at reverse breakover voltage VBR which takes place due to avalanche

breakdown, a large current flows through SCR whereas the voltage across the device remains constant. Once the SCR conducts in reverse, it can not be reused.

The region from 0 volts upto VBR volts in which the SCR is reverse biased and non - conducting is called as "reverse blocking state".



Circuit Symbol



Basic Structure

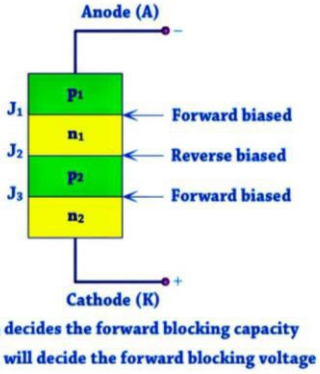


Fig 4: Forward blocking capacity of SCR

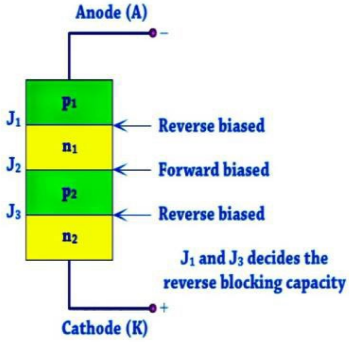
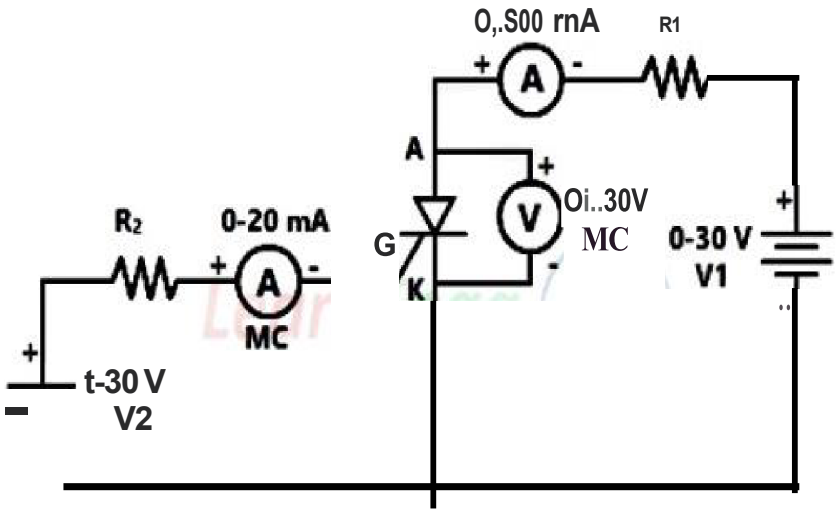


Fig 3: Reverse blocking capacity of SCR



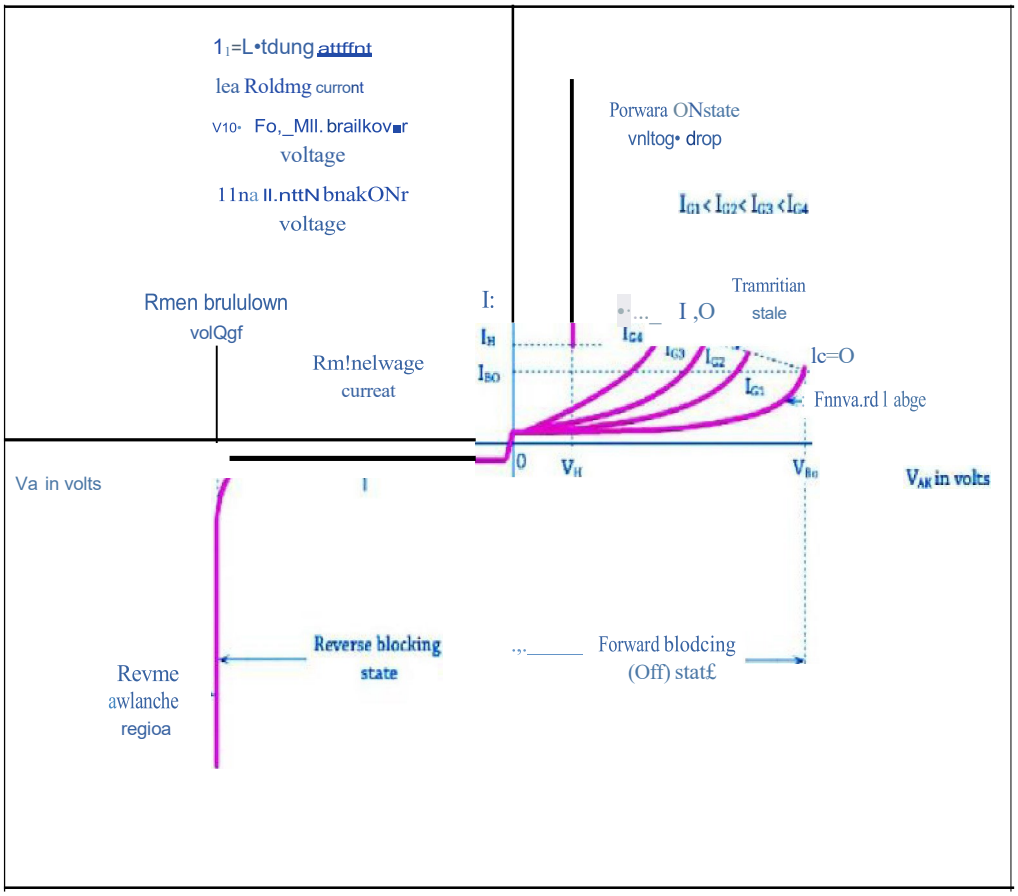


Fig S: V-1characteristics of a SCR

PROCEDURE :-

1- Connection are made as per the circuit diagram, Connect the DC power supply to the positive terminal of the input V1, the positive terminal to resistor R1.

2- connect the register R1 to the ammeter terminals, and the ammeter terminals to the anode terminal of SCR.

3- Connect the negative terminal of the input V1 to the ground.

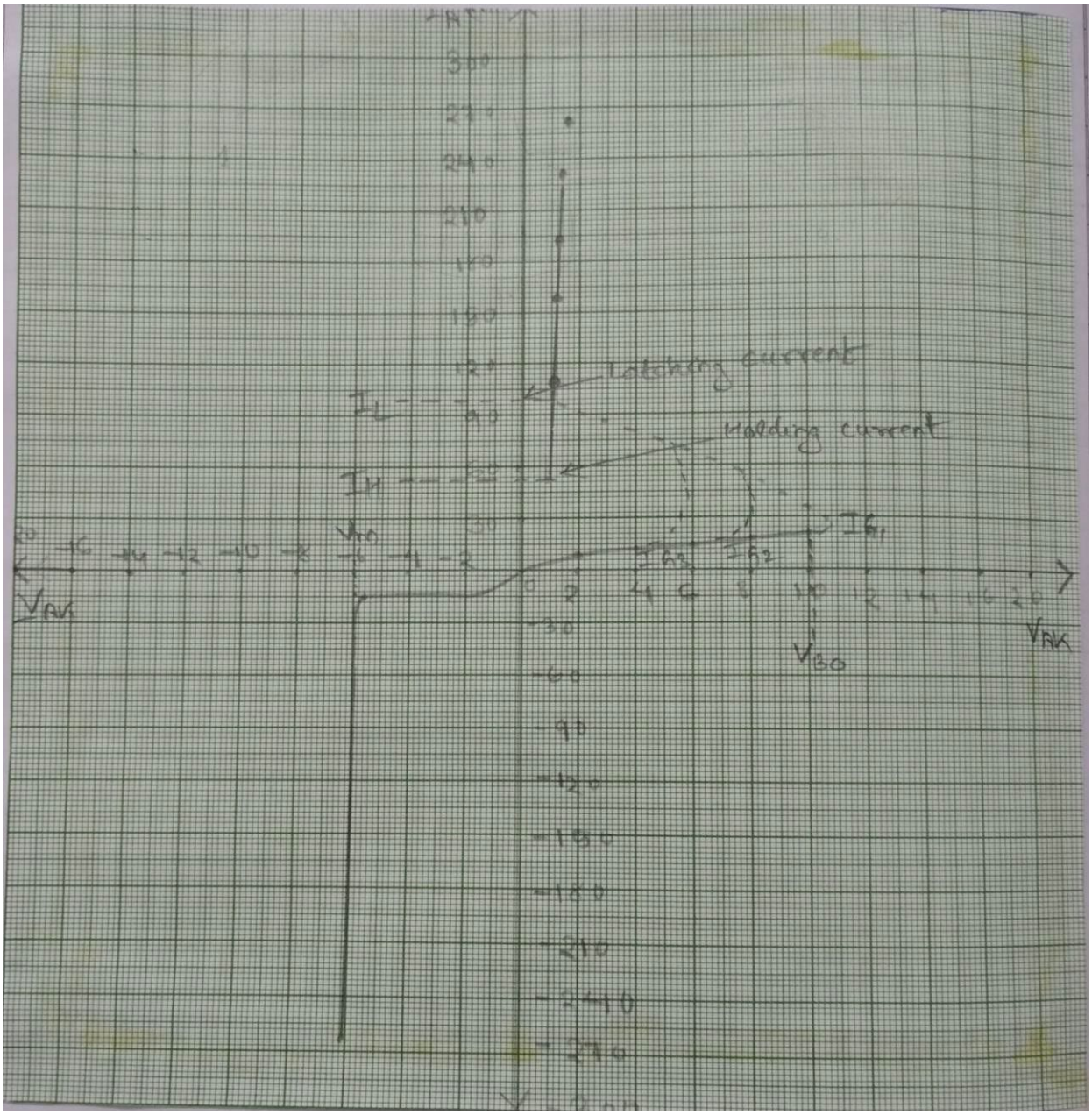
4-connect the positive terminal of the input V2 to DC power supply then connect the positive terminal to resistor R2.

5- Connect the resistor R2 to the ammeter terminals and the negative terminal of the input V2 to the ground.

6- connect the ammeter terminals of the anode circuit to the analog ammeter and also the gate circuit terminal to analog emitter.

7- Now ,connect the voltmeter terminals of the circuit to an analog voltmeter and switch ON the trainer kit.

Keep pot 2 in minimum position and set gate current IAS as zero, increase the voltage Vak using pot 1 and note down the voltmeter Vak and ammeter Ia readings. Note down the forward breakover voltage Vbo and latching current Il reduce Vak and simultaneously verify the state of SCR.



Observation Table :-

Forward characteristics of SCR -

Ig=0mA			Ig = 2.3 mA		Ig =5.7 mA	
Sl no	Vak (V)	Ia (mA)	Vak (V)	Ia (mA)	Vak (V)	Ia (mA)
1						
2						
3						

4						
5						

Reverse characteristics of SCR -

Sl no	Vak (V)	Ig (mA)
1		
2		
3		
4		

Conclusion :- From the above experiment we studied the VI characteristics of SCR successfully.

• Aim of the experiment :- Study of V-I characteristics of DIAC

• Apparatus Required :-

SL NO.	ITEM	QUANTITY
1	DIAC Characteristics Trainer kit	1
2	Voltmeter (0-50)v MC ,Digital type	1
3	Ammeter (0-500)mA MC , Digital type	1
4	Patch chords	As Per required

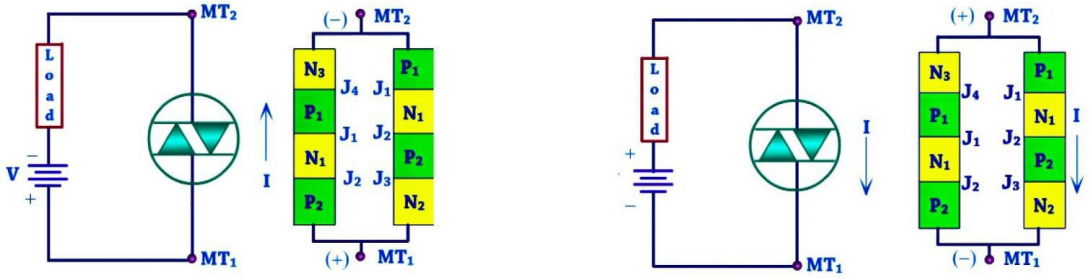
•Theory:-

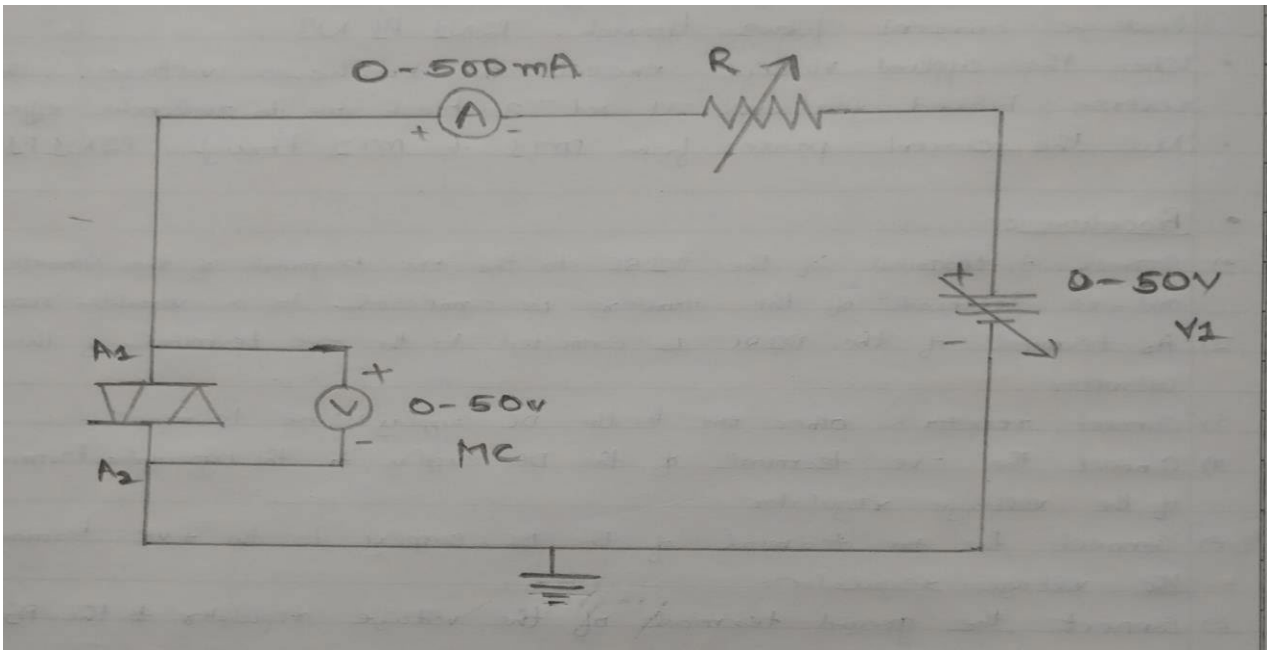
•DIAC is one of the most important device used to trigger the TRIAC. It is some time called as a TRIAC without gate terminal .

•The equivalent circuit of DIAC shows two SCRS back to back.

•The DIAC can operate in bath the directions depending upon the voltage applied between M12, MT1.

• In both the sides the DIAC can be switched only when the applied voltage reaches the breakover voltage.





•MT2 is positive with respect to MT1:-

• When MT2 is positive with respect to MT1, the junction J1 and J3 are working in forword bias and the junction J2 and J4 are working is reverse bias.

• Now a small leakage current flows through P1 N1 P2 N2 AND no current flows through P2 N1 P1 N2 .

• when the Applied voltage exceeds the breakover voltage the reverse biased junction J2 and J4 break due to avalonche effect .

•so current flows from MT2 to MT1 through P1 N1 P2 N2 , which turn ON the DIAC

•MT2 is negative with respect to MT2:-

*when MT2 is nagalive with respect to MT2. The junction J1 and J3 are reverse, biased and the junction J2 and J4 are forword biased

*Therefore, no current flows through P1 N1 P2 N2 now a small leakage current flows through P2 N2 P1 N3.

*When the Applied vollage exceeds the breakover vollage, The reverse biased junction J7 and J3 break due to avalonche effect.

* Now the current passes from MT1 to MT2 through P2 N2 P1 N3.

*Procedure:”

1) Connect Al terminal of the DIAC to the +ve terminal of the Ammeter and -ve terminal of the Ammeter is connected to a variable resistor.

2) As Terminal of the DIAC is connected to the -ve terminal of the voltage.

3) Connect resistor’s other end to the Dc suppley’s +ve learonal.

4) Connect the -ve Terminal of the Dc supply to the ground terminal of the voltage regulator.

5) connect the +ve terminal of the Dc supply to the +ve terminal of the voltage regulator.

6) connect the ground terminal of the voltage regulator to the A2 terminal of DIAC

7) Now set DIAC on forward biase condilion using the switch.

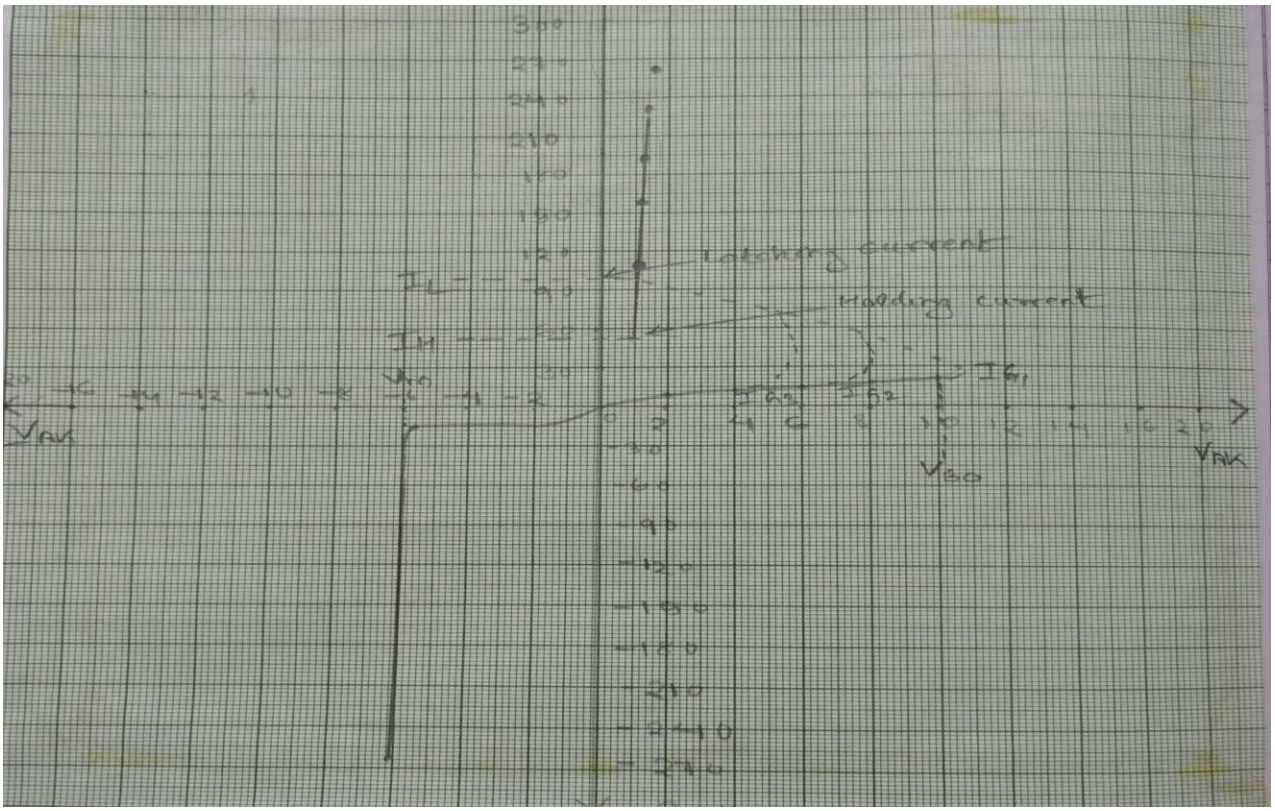
8) Increase the vollage across the DIAC in steps of 5v by ralaling The vollage regulator knobin The clockwise direction and note the voltage and corresponding current reading in the observation table.

9)Take the readings of voltage and ammeter.

10) After taking reading, the voltage regulator was returned to the zero position.

11) Set DIAC on reverse bias by using the tiggle switch .

12) Simillaty increase the voltage across the DIAC in steps of 5V by ratating the voltage regulator knob anticlockwise direction and current is the observation table.



Observation table :-

Forword characteristics;-

SL NO.	Diac voltage(V)	Diac current (mA)
01		
02		
03		
04		
05		
06		
07		
08		
09		
10		
11		
12		

Reverse characteristics:-

Forword characteristics;-

SL NO.	Diac voltage(V)	Diac current (mA)
01		
02		
03		
04		
05		
06		
07		
08		
09		
10		
11		

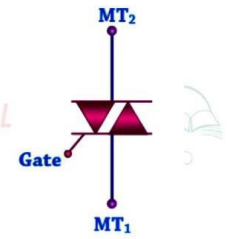
Conclusion:- From the above experiment we studied the VI chracterstics of DIAC successfully.

•Aim of the experiment :- Study of V-I characteristics of TRIAC

•Apparatus Required :-

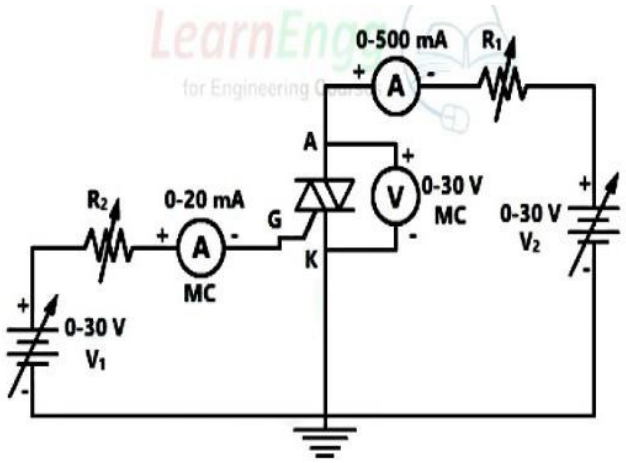
SL NO.	ITEM	QUANTITY
1	Ammeter(0-20)mA MC digital type	1
2	Voltmeter (0-50)v MC ,Digital type	1
3	Ammeter (0-500)mA MC , Digital type	1
4	Patch chords	As Per required

- Theory:-
  - TRIAC is a three terminal bidirectional semiconductor device .TRTAC stands for trinde and AC .it conducts current in both direction and gateterminal controls it.
  - The different between thyristor and TRIAC is SCR conducts current in only one direction , But TRIAC conducts in both direction.It is used as AC switch.



TRIAC symbol

- V-I characteristics of TRIAC:-
  - The current flows MT1 to MT2 through .P2 N1 P1 N4 (SCR1).The junctions P2N1 and P1P4 are working in forward bias and the junction N1P1 is working in reverse bias.
  - Initially the TRIAC operates in forward and reverse blocking mode and only small leakage current flows through it
  - When the Applied voltage at the MT2 terminal is further increased and when it crosses the breaker voltage applied at the GATE terminals controls this current flows.



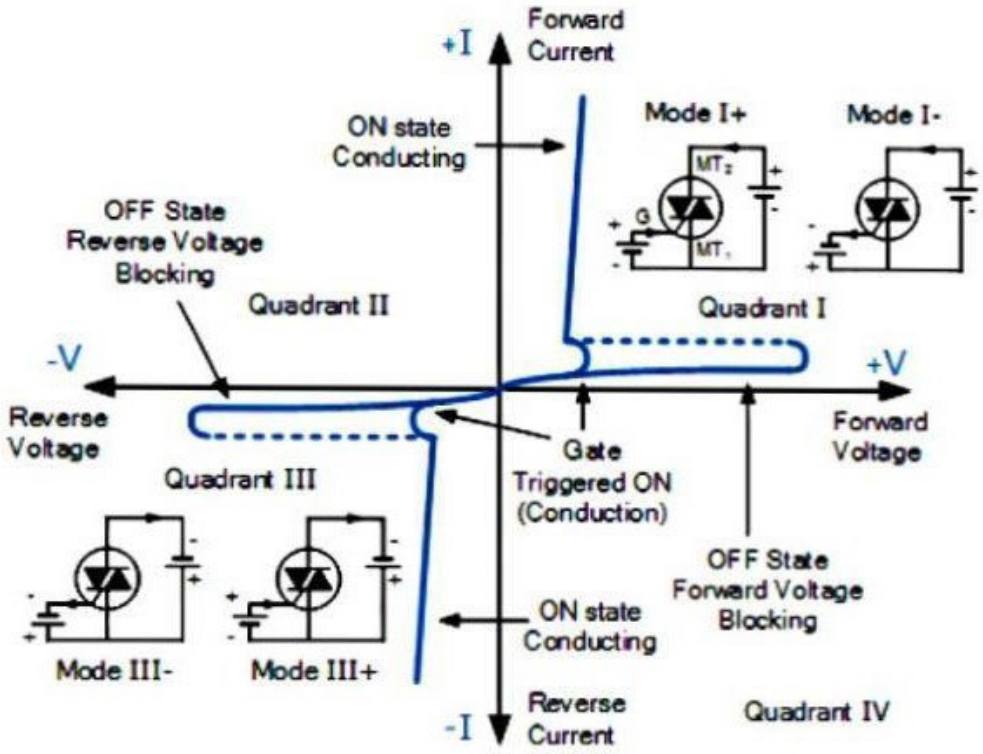
• Working of TRIAC :-

• When MT2 is positive and gate terminal is positive :-

- When MT2 is terminal is made positive with respect to the terminal MT1 and when positive voltage is applied , at the gate terminal the path of the current flow from MT2 to MT1 will be P1-N1-P2-N2 .
- The junction between P1N1 and P2N2 are forward biased and junction between N1P2 is reverse biased and breakdown occurs at this junction .

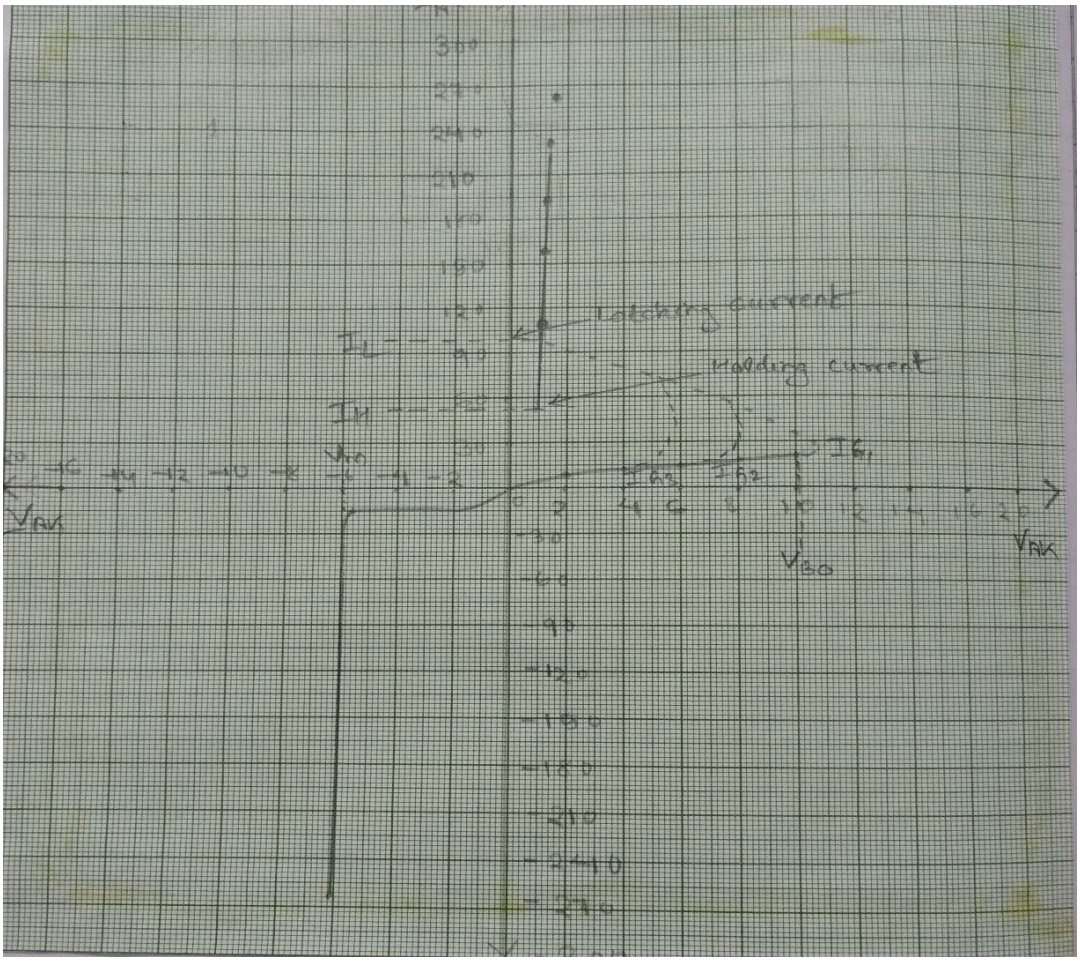
• When MT2 is negative and gate terminal is negative:-

- When the MT2 terminal is made negative with respect to the terminal MT1 and when negative voltage is applied at the gate terminal the path of the current flow from MT2 to MT1 will be P2N1P1N4 .
- The junction between P1N1 and P2N2 are forward biased and junction between N1P2 is reverse biased and breakdown occurs at this junction.



• Procedure :-

1. Connect the DC power supply to the positive terminal of the input V1.
2. Connect the positive terminal of the input terminal V1 to the resistor R1.
3. Connect the resistor R1 to the armature terminals .
4. Connect the Ammeter terminal to the MT1 terminal of the TRIAC .
5. Connect the negative terminal of the input V1 to the ground .
6. Connect the DC power supply to the positive terminal of the input V2 .
7. Connect the positive terminal of the input V2 to the resistor R2 .
8. Connect the resistor R2 to the Ammeter terminal .
9. Connect the negative terminal of the input V2 to the ground.
10. Connect the voltmeter terminal across the TRIAC to a digital voltmeter.
11. Switch ON the trainer kit .
12. Increase the voltage across the TRIAC in steps of 2V by varying input .
13. For reverse characteristics of TRIAC set TRIAC on reverse bias condition using the gate and TRIAC circuit.
14. Repeat the same procedure for reverse bias condition.



• Observation table:-

Forward characteristics :-

When,IG1=0mA		
SL NO.	**Traic voltage (v)**	**Traic current (mA)**
1		
2		
3		
4		
5		
6		
7		
8		

When,IG1=		
SL NO.	**Traic voltage (v)**	**Traic current (mA)**
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		

- Reverse characteristics :-

IG1=0mA			IG1=	
SL NO.	Traic voltage (V)	Traic current (mA)	Traic voltage(V)	Traic current (mA)
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				

IG1=		
SLNO.	Traic voltage (V)	Traic current (mA)
1		
2		
3		
4		
5		
6		
7		

8		
9		
10		
11		
12		

- Conclusion :-From the above experiment we studied the VI characteristics of TRIAC successfully.

Aim of the experiment:- study of drive circuit for SCR and TRIAC using DIAC.

Apparatus required:-

Sl no	item	quantity
1	Lamp (25w)	1
2	Single phase AC motor ½ HP	1
3	Voltmeter(0-300V) M.I.	2
4	Tachometer, digital type	1
5	Patch chords	As per requirements
6	DSO with probes	1
7	Speed control of AC motor using TRIAC with DIAC control trainer	1

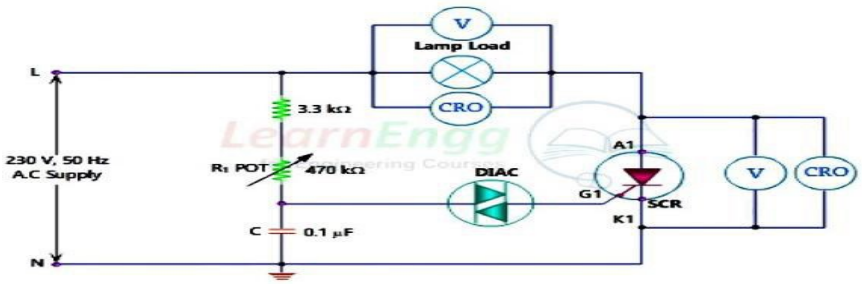
Theory

SCR with DIAC firing

A drive circuit for SCR using a DIAC is shown here. When the circuit is energized the capacitor charges slowly over a period of time determined by the RC time constant. After the capacitor has been charge to a voltage equal to the break over voltage of the DIAC, it switches the DIAC into conduction. The capacitor is then rapidly discharged into the gate terminal of the SCR.

The gate current Ig flows and the SCR conducts on the positive half cycle only as it is operating in quadrant 1. It is to be noted that SCR once gate on will only switch off again when it supply voltage falls to value such that its Anode current Ia is less than the value of holding current Ih after a short interval the Diac of and turn off the cycle repeats

This arrangement requires a relatively low power to charge the capacitor from the disease of but is supplies are large power for a short time for reliable SCR turn ON.



Study of drive circuit for SCR and TRIAC using DIAC-

-DIAC is a two junction bidirectional semiconductor device designed to breakdown when the AC voltage across the exceeds a certain level passing current in either direction. The breakover voltage of DIAC is 40 KV .

-The diode AC switch or DIAC is another solid state three layer two junction semiconductor device but unlike the transistor the DIAC has no base connection making it a two terminal device labelled A1 and A2.

-In ON-OFF switching applications SCR and TRIAC could be triggered by simple circuits producing steady state gate current. The DIAC is commonly used as a solid state triggering device for other semiconductor switching devices mainly SCR's and TRIAC's.

-TRIAC are widely used in lamp dimmers and motor speed controllers and as such the DIAC is used in conjunction with the TRIAC to provide fullwave control of the AC supply.

PROCEDURE :-

1-Connect a voltmeter across the lamp load and another voltmeter across a DSO

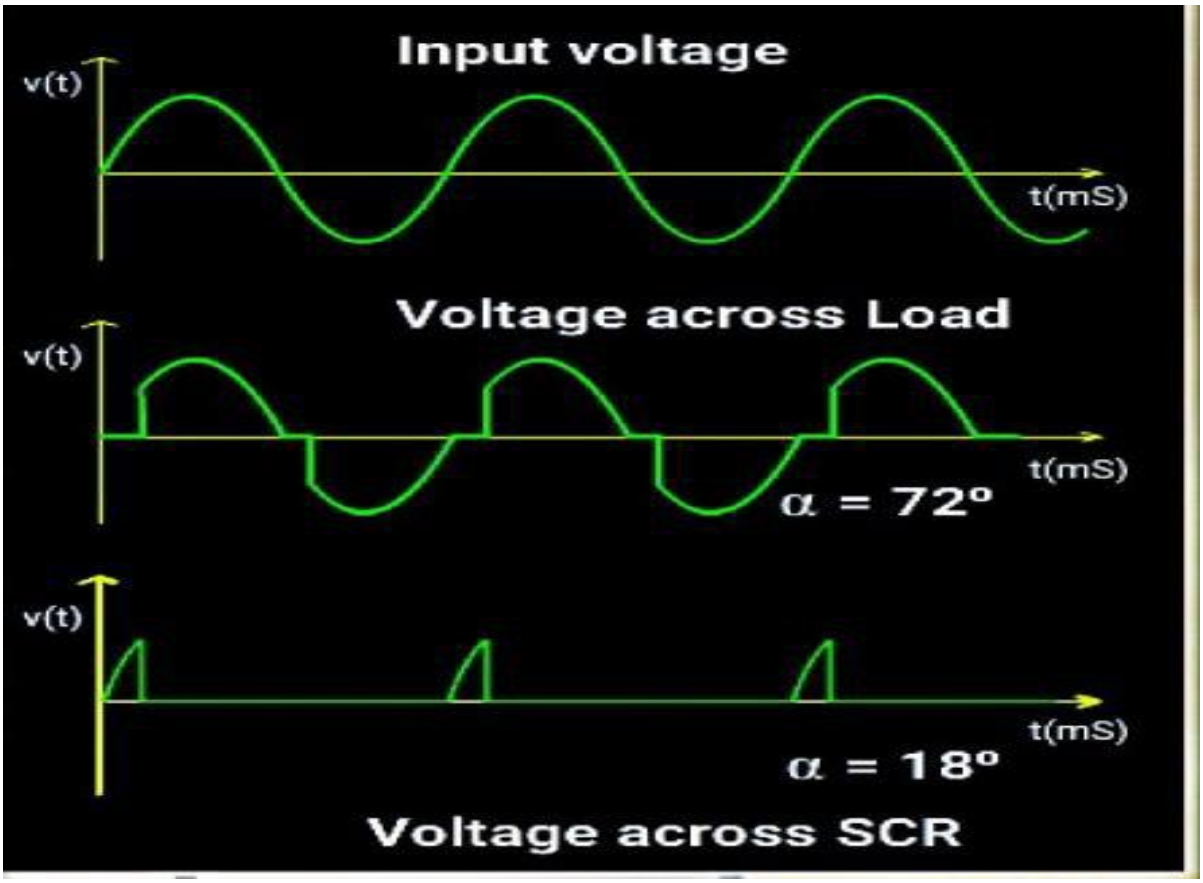
2- connect A1 terminal of the SCR to the lamp load and K1 to ground.

3- connect the gate terminal of the SCR one terminal of the DIAC.

4- Another terminal of the DIAC is connected to one terminal of the Potentiometer is connected to the lamp load.

5- Now connect to 230volt ,50Hz Ac supply to the whole circuit. Switch ON the supply and very in the Potentiometer slowly and observed different voltages across the SCR and intensity of the bulb.

6- After completion of the reading switch OFF the main power supply.



Observation table:-

Position of Potentiometer	Load firing angle (degree)	Voltage across the load (V)	Voltage across the SCR(V)	Condition of the lamp

Conclusion:- From the above experiment we studied the drive circuit for SCR and TRIAC using DIAC successfully.

- Aim of the experiment:- To study phase controlled bridge rectifier using resistive load

Apparatus required:-

SLNO.	Item	Quantity
01	Single phase fully controlled converter power circuit kit	01
02	Resistive load (60 Watt lamp)	01
03	DSO with cords	01

- Theory: -

An alternative circuit arrangement of a two quadrant converter operating from a single phase supply is a fully controlled bridge circuit .In bridge circuit diagonally oppositive pair of thyristor are mode to conduct and are commutated simultaneously .

During the first positive half cycle SCRS T1 and T2 are Forword biased and if they are triggered simultaneity , then current flows through the path L-T1-R-T2-N . Hence thyristor T1 and T2 are conducting .

During the negative half cycle SCRS T3 and T4 are forward biased and if they are triggered simultaneously current flows through the path N-T3-R-T4-L .

Thyristors T1,T2,T3 and T4 are triggered at the same firing angle in each positive and negative half cycle respectively. When supply voltage Fulls to zero. The thyristors T1,T2;T3 andT4 turn off by natural commutation .

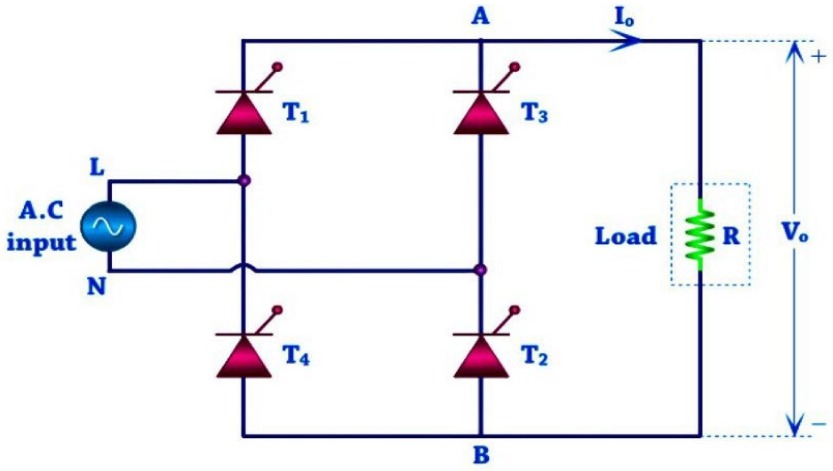


Fig 1: Fully-controlled bridge-circuit with resistive-load

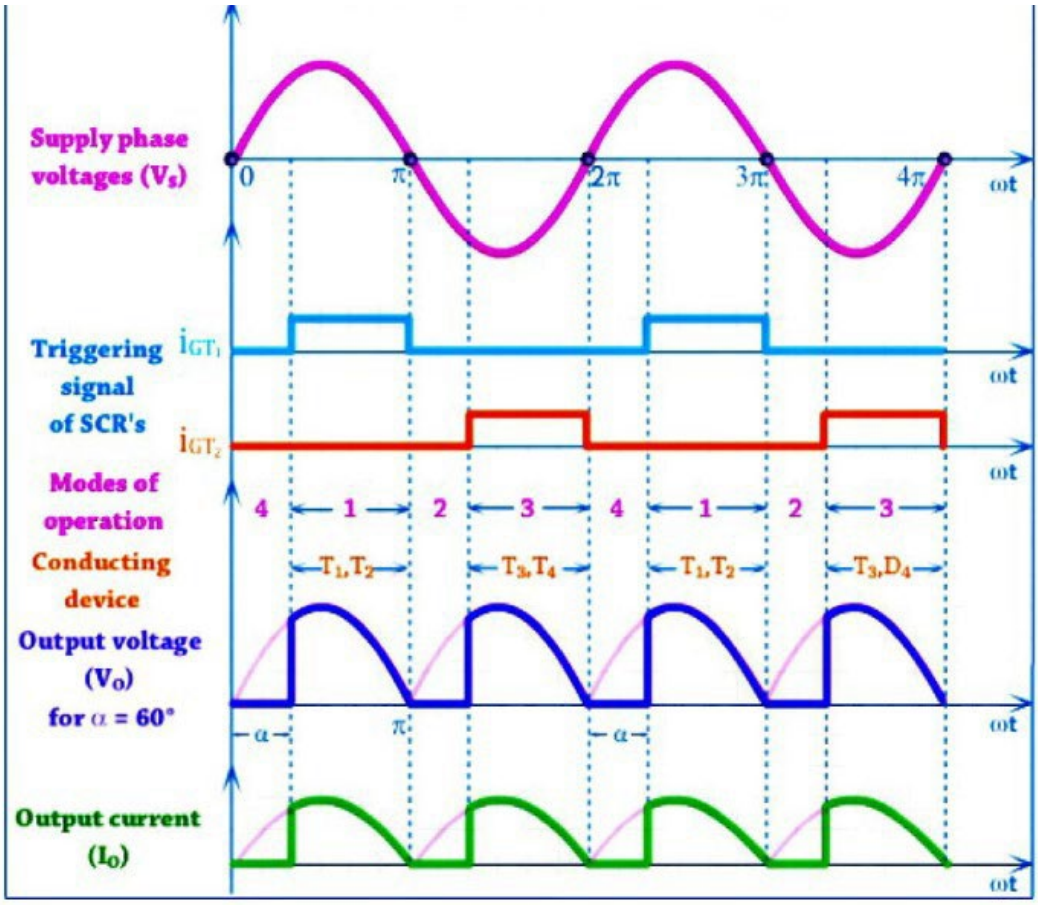


Fig 6: Waveforms of 1ϕ fully controlled converter with R - load

- Procedure:-

1. Connect the gate signal terminal to the firing CKT of SCR.
2. Connect the positive and negative probe of the CRO across the SCR.
3. Observe the waveform in CRO by varying the different firing angle in steps and note down the voltmeter and Ammeter reading in table for practical observations.

- Conclusion:- From the above experiment we studied the phase controlled bridge rectifier using resistive load .

Aim of the experiment :- To study Series Inverter

Apparatus Required :-

Sl no.	Item	quantity
1	Regulated power supply	01
2	Single phase series inverter	01
3	DSO with probes	01
4	Rheostat-100 Ω, 2A	01
5	Patch chords	As per requirements

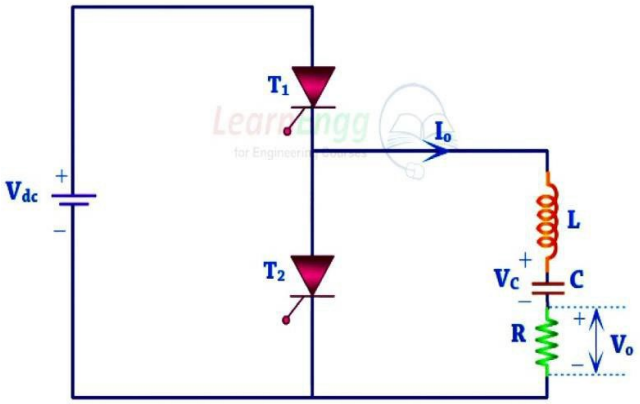


Fig 1: Series inverter

Theory :-

In the series inverter the commutating inductance and capacitance are in series with the load. Thus the commutation circuit is a part of load.

In the circuit diagram of series inverter, L and C are the commutating components.

T1 and T2 carry load current in positive and negative half cycles.

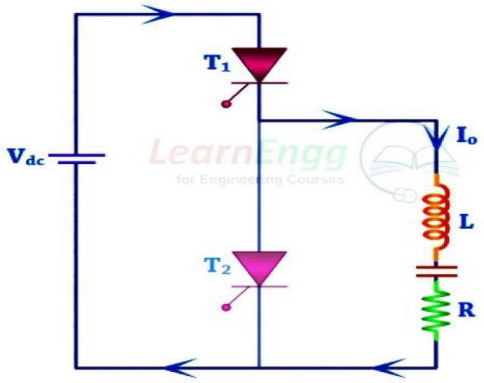


Fig 2: Equivalent circuit for mode 1

Mode 1-

At the beginning of this mode capacitor is charged to negative voltage

At T1 SCR T1 is triggered

the output current starts flowing through T1 and LCR equivalent circuit(T1-L-C-R)

Due to RLC circuit the current increases sinusoidally

The current becomes maximum when the capacitor voltage is equal to Vdc

then the current reduces at T2 the current becomes zero Hence T1 turn off

The capacitor charges to the value higher than Vdc. This charge is held by the capacitor.

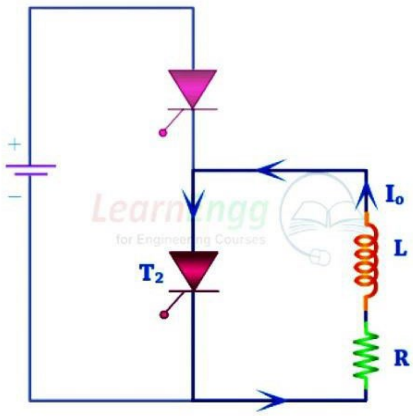


Fig 3: Equivalent circuit for mode 2

Mode 2-

This mode begins when SCR T2 is triggered at T3

The current starts flowing in opposite direction

The current flow direction is T2-R-L-C.

The waveform shows the negative half cycle of the current

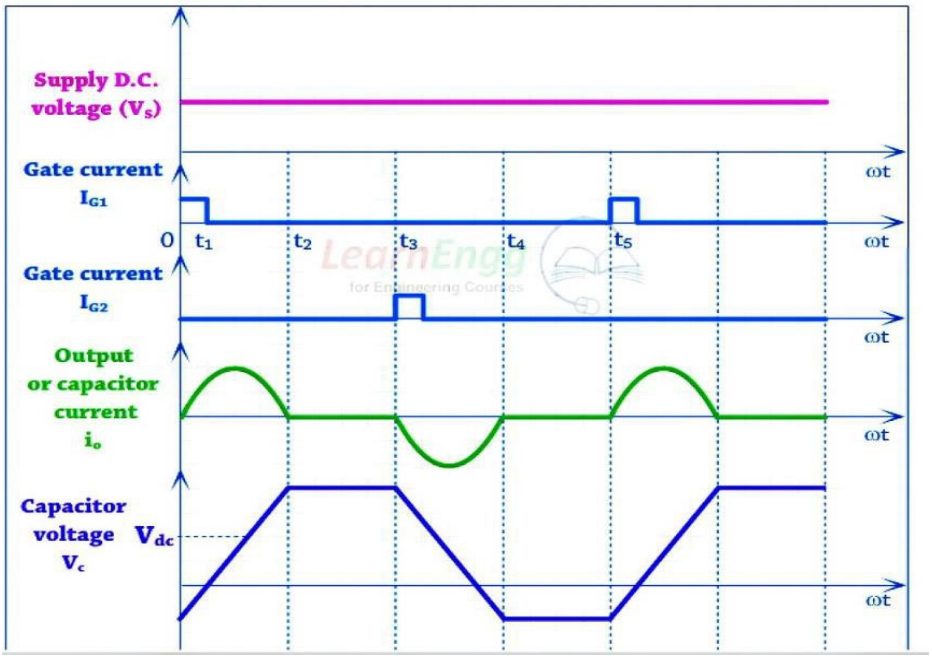
The capacitor start is charging in the RLC circuit

The current becomes maximum when capacitor voltage is zero

At T4, the current starts reducing and becomes zero. So T2 turn off at T4

The capacitor is charged to negative voltage. This charge is held by the capacitor. The cycle repeats when T1 is triggered again.

The output voltage waveform for series inverter is given.



Procedure :-

1. Connect the circuit as per the circuit daigram.
2. Connect the positive terminal of the regulated power supply to the Vdc input terminal of the trainer kit.
3. Connect the positive terminal of the trainer kit to capacitor C1
4. Connect the other terminal of capacitor C1 to capacitor C2
5. Connect the other terminal of capacitor C2 to the negative terminal of the trainer kit.

6. Connect the negative terminal of the trainer kit to the negative terminal of the power supply.
7. Now connect the positive terminal of the trainer of the trainer of the traioner kit to the anode terminal of SCR T1
8. Connect the cathode terminal of SCR T1 to the inductor L1.
9. Connect the inductor L2 to the anode terminal of SCR T2.
10. Connect the common terminal between L1 and L2 to the cut off position of the rheostat.
11. Connect the channel 1 terminal of the CRO across the Rheostat terminals to observe output waveforms.
12. Turn ON the main switch.
13. As the load varies from maximum to minimum the amplitude of voltage increases whereas the frequency remains the same.

Conclusion :-

From the above experiment we studied about the series inverter successfully.

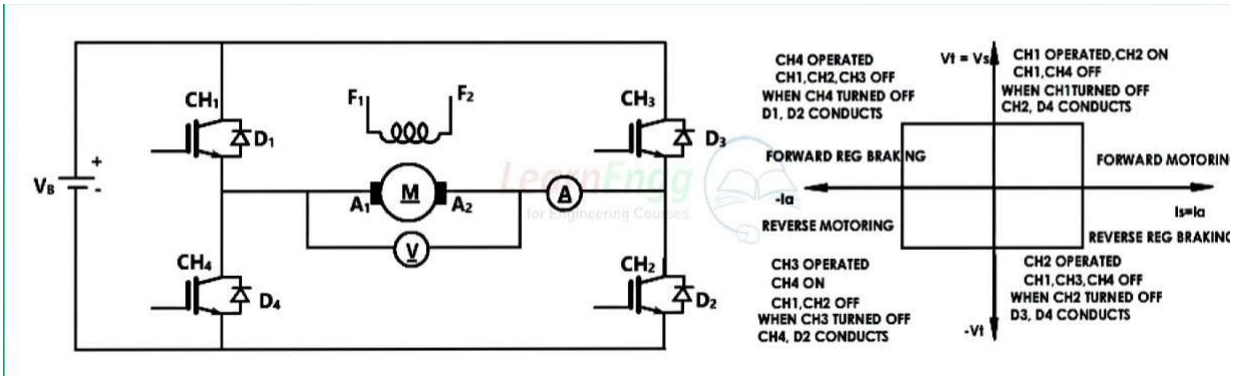
- Aim of the experiment :- To perform the speed control of DC motor using chopper.

- Apparatus Required:-

SLNO.	Item	Quantity
1	Speed control of DC motor using chopper power circuit kit	01
2	DC regulated power supply (0-240)v	01
3	Voltmeter MC (0-300)v digital type	01
4	Ammeter MC (0-15)A digital type	01
5	Tacho meter (0-1500rpm)	01
6	DSC with cords	01
7	DC motor 0.5 HP	01

- Theory :-

- The chopper is a static power electronic device which convert fixed DC input voltage to a variable DC output voltage.
- It is also considered as a DC equivalent of an AC Transformer.
- It's power semiconductor device for a chopper circuit can be SCR,BJT, MOSFET ,IGBT,GTO .
- Among the above switches, IGBT and GTO are widely used , represented by a switch generally.
- It connects source to load and disconnects the Loads form source at a fast speed.
- When the switch is off, no current will flow when the switch is On ,current flows through the load.
- For all the chopper configurations operating from Fixed DC input voltage , the average value of the output voltage is controlled by , periodic opening and closing of the switches used in the chopper circuit.



- Duty cycle :-
- The total time period of one cycle of output waveform each constant .
- The average output voltage directly proportional to the on time of chopper.
- The ratio of on time total time is defined a dirty cycle .
- The average output voltage it directly proportional to the on time of chopper .
- if it can be varied between 0 and 1 or between 0 and 100%.
- a lawyer dirty cycle slows the motor , a high duty cycle in increases motor speed.

- Motoring mode:-

- During this mode, TH1 is operated, CH3, CH4 are kept off and CH2 is kept on.
- When CH1, CH2 are on , motor voltage (Vt=vs) is positive and positive armature current (ia) begins to flow.
- When CH1 is turned off, positive armature current free-wheels and decreases as it flows through CH2 ,D4 .
- This results in forward motoring mode in first quadrant.

- Procedure:-

1. Connect the circuit as per the circuit diagram.
2. Triggering pulses are connected internally to the respective MOSFETS.
3. Switch on the forward motoring toggle switch.
4. Dring forward motoring condition (I quadrant)CH1 operated.
5. CH2 is ON and a CH3 and the CH4 are off.
6. Observe the output voltage waveform in CRO by varying the duty cycle in steps and note down the voltmeter , ammeter readings in table and also speed of DC motor is noted.

- Observation table:-

SLNO.	Duty cycle(d0)	V0	I0	Speed,(rpm)
1				
2				
3				
4				
5				

- Conclusion:-From the above experiment we performed the speed control of DC motor urging chopper successfully.

AIM OF THE EXPERIMENT :- TO STUDY SINGLE PHASE CYCLECONVETER

APPARATUS REQUIRED

SL NO	ITEM	QUANTITY
01	PEC14M14 Module cycloconverter	01
02	DSO WITH PROBES	01
03	DIGITAL MULTIMETER	01
04	PATCH CHORDS	As per required

THEORY

A cycleconverter is a converter that converts AC voltage of one frequency to another frequency. without an intermediate DC link. According to the output frequency they are two types of cycloconverter namely.

Single phase Centre -tapped cycloconverter

- There are four SCRs S1, S2 ,S3 and S4 where S1 and S3 from the positive group and S2 and S4 from negative group which will operate one after the other to make the output positive and negative respectively.
- The SCRs 1,2,3 and 3,4 are connected in antiparallel.
- The load is connected between the center tap of the secondary winding of the Transformer and on inductance 1.

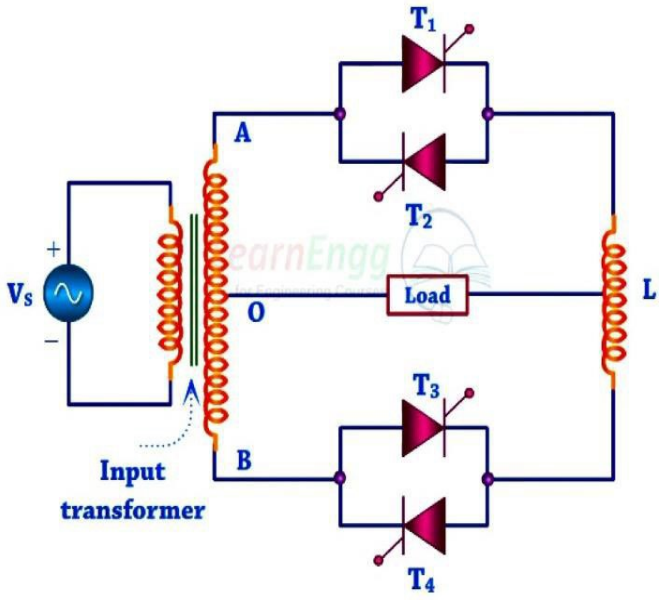


Fig 1: Centre-tapped cycloconverter

STEP DOWN CYCLO-CONVERTER

- step down cycloconverter steps down the fixed frequency power supply input into some lower frequency.
- It is a frequency changer. If fs and fo are the supply and output frequency then fo< fs
- step down cycle converter requires natural communication which is easy to build and has many application
- The load Voltage waveform for the multiple midpoint configuration for an output frequency equal to one third of the input frequency.

$$fout = \frac{1}{3}\, fin$$

OPERATION OF STEP-UP CYCLOCONVERTER

- During the positive half cycle of input supply voltage positive group thyristor T1 and T4 are forward biased for ω t=0 to ω t=π
- As such, SCR T1 is fixed to turn it ON at = 0 such that load voltage is positive with terminal A positive and one negative.
- The load Voltage thus follows the positive envelope of the input supply voltage.
- At some instant ω t =tω 1, the conducting thyristor T1 is force commutated and the forward biased thyristor T4 is fixed to turn it ON. During the period T4 conducts, the load voltage is negative because 0 is positive and A is negative this time.
- The load or output voltage traces the negative envelope of the supply voltage.
- This results in an output frequency fo more than the input supply frequency fs.

OUTPUT VOLTAGE CONTROL

-The AC voltage of the cycloconverter can be changed by Varying the firing angle of the thyrister.

- with the restive load each SCR conducts for a duration of (π-) and turns OFF naturally at the end of each half - cycle

PROCEDURE -

(1) Connect the circuit as per the circuit diagram.

(2) connect the anode terminal A1 of SCR1 to the cathode Terminal K3 of SCR3

(3) Connect the cathode terminal K1 of SCR1 to the anode terminal A3 of SCR3.

(4) Connect the cathode terminal K1 of SCR1 to the cathode terminal K2 of SCR2.

(5) Connect the cathode terminal K2 of SCR to the anode terminal of A4 of SCR.

(6) Connect the anode terminal A2 of SCR2 to the cathode terminal K4 of SCR 4.

(7) Connect the supply of 24v AC to the anode terminal A2 of SCR2.

(8) Connect the positive terminal of the multimeter set in a current mode to the anode terminal A3 of SCR3.

(9) Connect the negative terminal of the multimeter set in a current mode to the load terminal R2.

(10) Connect the CRO terminal across the load terminal R1 and R2 to observe the output waveform.

(11) Connect a Multimeter across the load R1 and R2 to measure the load voltage.

(12) Vary the firing angle in steps and observe the output waveform in CRO.

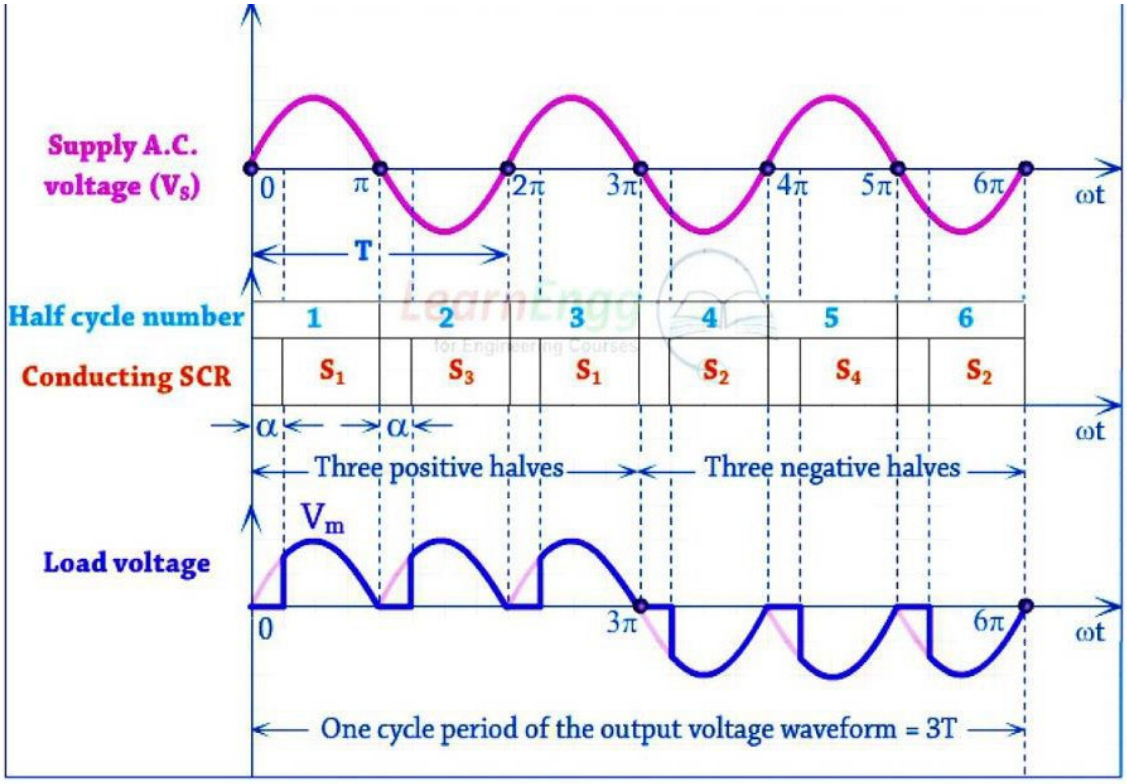


Fig 2: Waveforms of midpoint configuration

CONCLUSION

From the above experiment we studied about single phase cycloconverter