News letter

JOTHIRMAEEE

YEAR 2019-2020

Department of

Electrical & Electronics Engineering
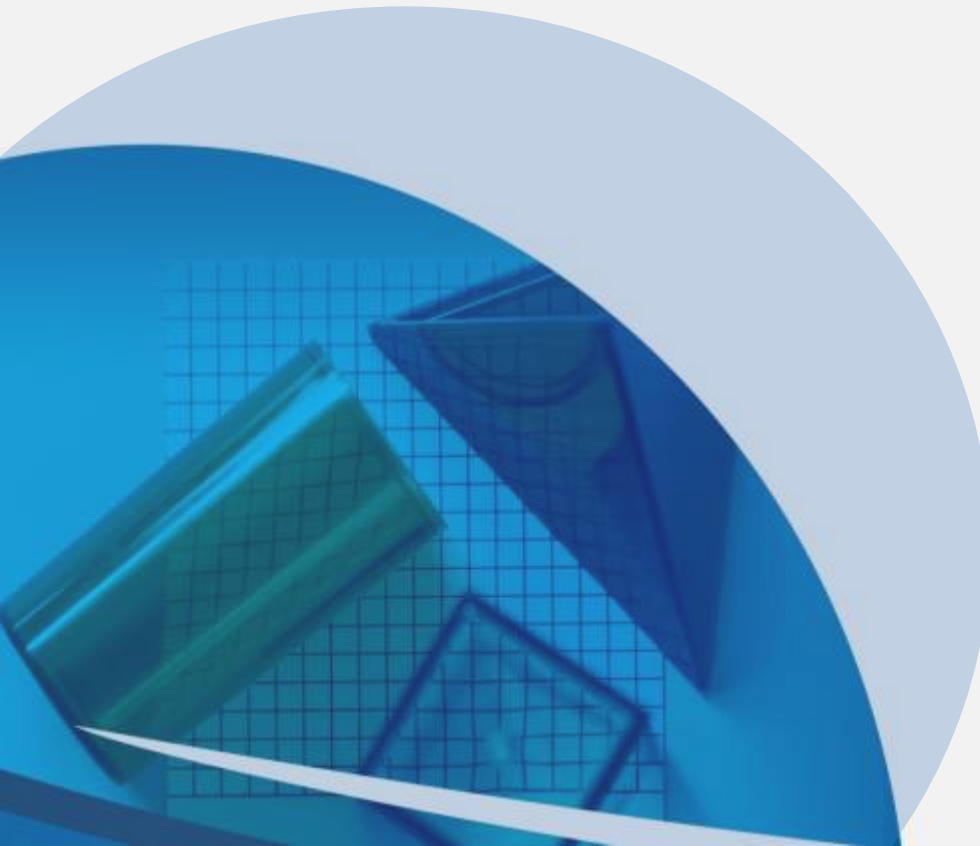
Department of Electrical and Electronics Engineering

VISION

To create globally competent Electrical & Electronics Engineers with sound technical knowledge and social responsibilities

MISSION

Mission 1: To impart quality technical education to Electrical and Electronics students by providing excellent teaching and learning environment by balancing both theoretical and practical aspects.

Mission 2: To encourage ethical values and leadership abilities in the Electrical and Electronics students so as to work towards growth of society

Mission 3: To provide industry oriented practical experience and skills necessary for employability, entrepreneurship and global competency.

DEPART MENT STUCTURE

HEAD OF THE DEPARTMENT

Mr. GURUPRASAD G B.E, M.Tech

Teaching staff

1) Miss. Shivarathnamma
2) Miss. Raziya Sultana C
3) Mr.shivaraja D M
4) Mrs. Sunitha S
5) Mrs. V Sri Teja Reddy
6) Mr. Irfan Basha
7) Mr. Shridhar M
8) Mrs. Thara G
9) Mr. Panduranga B
10) Mr. Chandra Shekar N
11) Mrs. Chandrakala B A
12) Mrs. Vasundhara D
13) Miss. Geetha P
14) Mrs. Rashmi B
15) Mr. Ranjith Rathod R
16) Mr. Dattatrya L Sawalker
17) Miss. Vanam pavani
18) Mrs. Savitha G G
19) Mrs. Priyanthica Paul
20) Mrs. Sapna S J
21) Miss. U priyanka
22) Mr. K Thippeswamy
23) Mrs. M Swarna Kamala
24) Mrs. Azizunnisa T K
25) Mr. Mahesh Kumar K
26) Miss. Ummi hani
27) Mr. Goutham Pramath H

Technical staff

1) Mr. Abdul Rawoof
2) Mr. Shrishilayya
3) Mr. Pampangouda
4) Mr. Abhishek H
5) Mrs. Umesh K N
6) Mr. Tulasi Ram
7) Miss. Swetha Kumari
8) Mr. Gabrial Raju
9) Mr. Shabir Basha
10) Mr. Lalith V
11) Mr. shaik johni
12) Mr. Rajashekhar
13) Miss. Yerramma .T
14) Mr. Somashekar. T

Toppers List

TOPPERS / RANKS (ODD SEM)

SEM	Reg. No.	Student Name	Marks	Class	Results (%)
I	459EE19020	ANIL V	565	Distinction	90.4
	459EE19114	MANJULA K	557	Distinction	89.12
III	459EE18119	MOHAMMAD NAWAZ	667	Distinction	92
	459EE18811	SOWJANYA B R	644	Distinction	88.82
V	459EE17102	MUSTAQ ALI	660	Distinction	88.00
	459EE17199	VENKATESH R	651	Distinction	86.80

Toppers up to V sem 2017-2020

Register number	Name	I sem	II sem	III sem	IV sem	V sem	VI sem	Aggregate
459EE17196	VASANTH KUMAR K	89.44	95.2	89.79	89.52	81.73	---	89.14
459EE17102	MUSTAQ ALI	84	87.84	81.66	84.55	88.00	---	85.21

Graduation day celebrations

Department of Electrical & Electronics Engineering - Sec - A

Department of Electrical & Electronics Engineering - Sec - B

Graduation day was celebrated to encourage the final year students about their achievements in the course time and give orientation to the students about their career in the year 2019-20

Participation at Intercollage paper presentation and secured second prize

**Vasanth Kumar K and Manoj K
Students of DEEE department has participated in Technical Workshop
"SAN- TECHMANTRA - 2019''
and has won second prize in the event of Paper presentation which
was held at Sandur Polytechnic, Yashwanth nagar.**

Technical paper
SEMI AND FULLY AUTOMATIC STAR DELTA STARTER

[1] Ranjith Rathod   [2] Vasanth Kumar   [3] Shubham Kumar Nishad

[1]Lecturer   [2], [3] Students

[1],[2], [3] Department of Electrical and Electronics, Sanjay Gandhi polytechnic. Ballari

INTRODUCTION:

WHAT IS SEMI AND FULLY AUTOMATIC STAR DELTA STARTER?

Star-delta starters are available in semi-automatic (SASD) and fully automatic (FASD) version.

ASD STARTERS-The motors starts in star' When the green button is pressed and a Timer automatically performs the changeover to 'Delta', SASD Starters-The motors starts in star' When the green button is pressed and changeover to 'Delta' When the button is released. This button must only be released when the motor reaches the normal speed. In both types of starters, the construction features and performance are identical. Types PK and PC Star-delta Starters Have three contactors either Types PC or PK1 contactors) and one bimetallic Thermal overload relay (Types PC/PK1/PNR) suitably wired and interconnected.

WORKING PRICIPLE OF STAR-DELTA STARTER:

This is the reduced voltage starting method. Voltage reduction during star-delta starting is achieved by physically reconfiguring the motor windings as illustrated in the figure below. During Starting the motor winding is connected in star configuration and this reduces the voltage across each winding 3. This also reduces the torque by a factor of three.
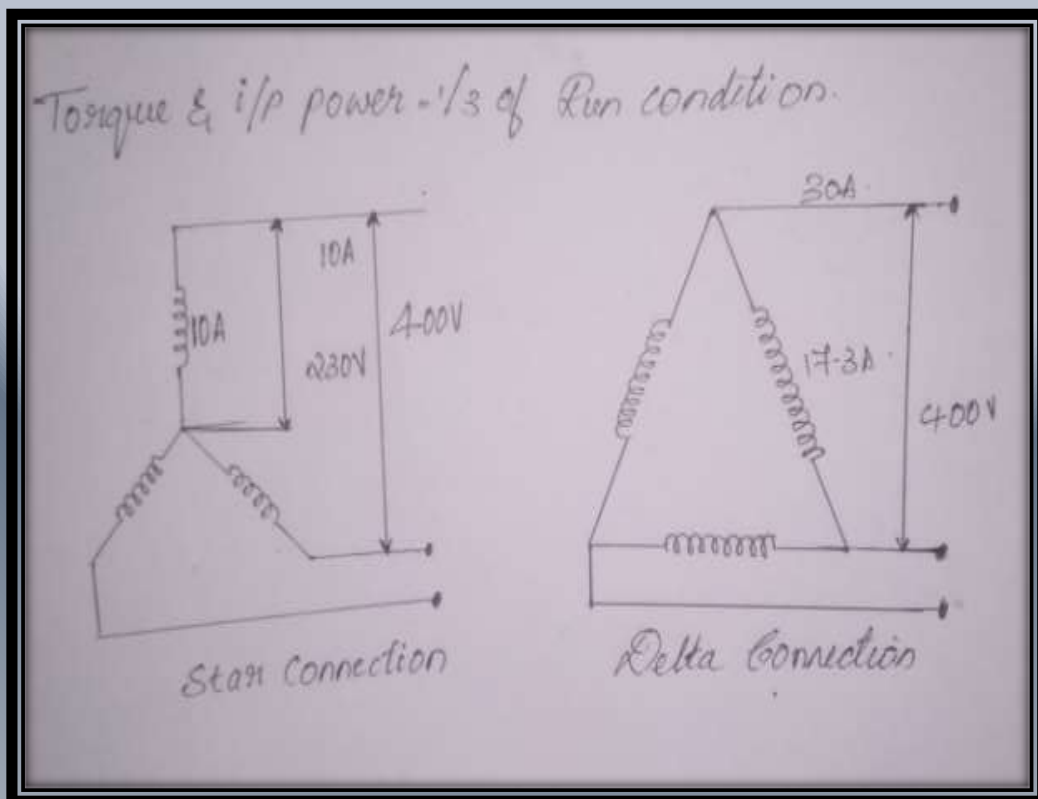
After a period of time the winding are reconfigured as delta and the motor runs normally. Star/delta starters are probably the most common reduced voltage starters. They are used in the attempt to reduce start current applied to motor during start as a means of during the disturbances and interference on the electrical supply. The star/delta starter is manufactured from three contactors, a timer and a thermal overload relay. The contactors are smaller than the single contactor used in a direct on line starter as they are controlling winding currents only. The currents through the winding are $1/\sqrt{3}$ of the current in the lines. There are two contactors that are close during run, often referred to as the main contractor and the delta contactor. These are AC3 rated at 58% of the current rating of the motor. The third contactor is star contactor and that only carries star current while the motor is connected in star. The current in star is one third of the current in delta, so this contactor can be AC3 rated at one third (33%) of the motor rating.

STAR DELTA STARTER CONSIST OF FOLLOWING UNITS:

• Contactors (main, star and delta contactors) 3 no's (for open state starter) or 4 no's (close transient starter).
• Time relay (pull-in delayed) 1 no.
• Three-pole thermal over current release 1 no.
• Fuse element or automatic cut-outs for the main circuit 3 no's.
• Fuse element or automatic cut-out for the control circuit 1 no.

POWER CIRCUIT OF STAR DELTA STARTER

The main circuit breaker serves as the main power supply switch that supplies electricity to the power circuit. The main contactor connects the reference source voltage R, Y, B to the primary terminal of the motor UI, VI, and W1. In operation, the main contactor (KM3) and the star contactor (KM1) are closed initially, and then after a period of time, the star contactor is opened, and then the delta contactor (KM2) is closed. The control of the contactors is by the timer (KIT) build into the starter. The star and delta is electrically interlocked and preferably mechanically interlocked as well. The star contactor serves to initially short the secondary terminal of the motor U2, V2, and W2 for the start sequence during the initial run of the motor from standstill. This provide one third of DOL current to the motor. Thus reducing the high inrush current inherent with large capacity motors at start-up. Controlling the interchanging star connection and delta connection of an AC induction motor is achieved by means of a star delta or delta control circuit. The control circuit consists of push button. Switches, auxiliary contacts and a timer.

CONTROL CIRCUIT OF STAR DELTA STARTER

CONTROL WIRING OF STAR DELTA STARTER (OPEN TRANSITION)
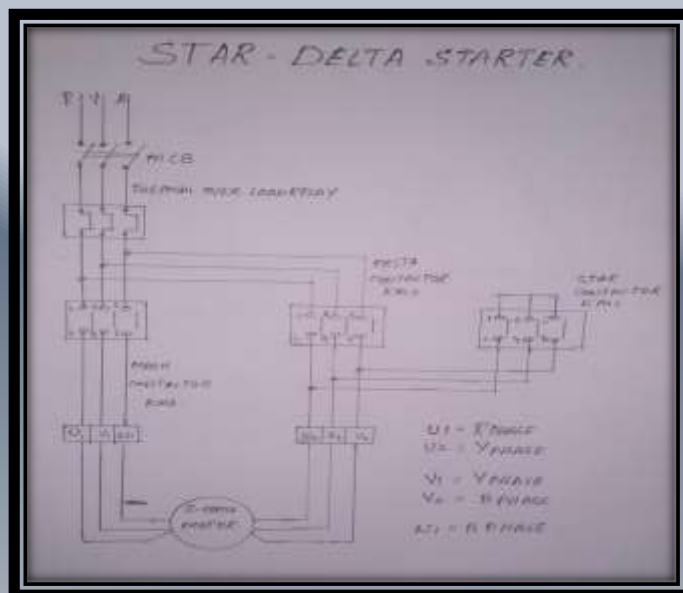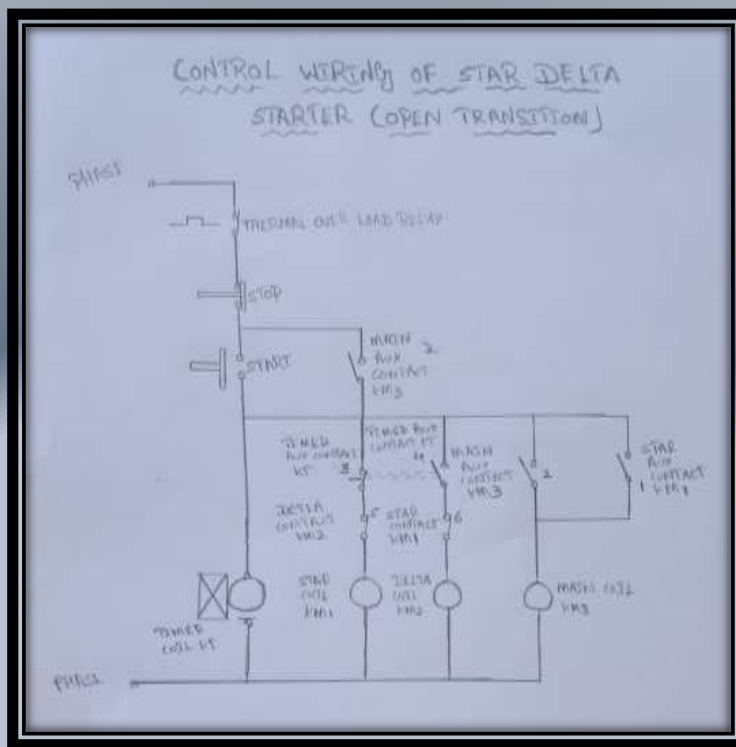
The ON push button starts the circuit by initially energizing star contactor coil (KM1) of star circuit and timer coil (KT) circuit. When star contactor coil (KM1) energized, star main and auxiliary contactor changes its position from NO to NC. When star auxiliary contact (1) (which is placed on main contactor coil circuit) become NO to NC it's complete the circuit of main contactor coil (KM3) so main contactor coil energized and main contactors and main auxiliary contactor change its position from NO to NC. This sequence happens in a friction of time. After pushing the ON push button switch, the auxiliary contact of the main contactor coil (2) which is connected in parallel across the ON push button will become NO to NC, thereby provided a latch to hold the main contactor coil activated which eventually maintains the control circuit active releasing the ON push button switch. When star main contactor (KMI) close its connect motor connects on STAR and its connected in star until time delay auxiliary contact. KT (3) becomes NC to NO. Once the time delay is reached its specified time, the timer's auxiliary contacts (KT) (3) in star coil circuit will change its position from NC to NO and at the same time auxiliary contact (KT) in delta coil circuit (4) change its position from NC to NO. Now motor connection changes from star to delta connection.

A normal close auxiliary contact from both star to delta contactors (5&6) are also placed opposite of both star and delta contactor coils, these interlock contacts serves as safety switches to prevent simultaneous activation of both star and delta contactor coil, so that one cannot be activated without the other deactivated first. Thus, the delta contactor coil cannot be activated when the star contactor coil is active, and similarly, the star contactor coil cannot also be active while the delta contactor coil is active. The control circuit above also provides two interrupting contacts to shut down the motor. The OFF push button switch break the control circuit and the motor when necessary. The thermal overload contact is a protective device which automatically opens the STOP control circuit in case when motor overload current is detected by the thermal overload relay, this is to prevent burning of the motor in case of excessive load beyond the rated capacity of the motor is detected by the thermal overload relay. At some point during starting it is necessary to change from a star connected winding to a delta connected winding. Power and control circuits can be arranged to this in one of two ways-open transition or closed transition.

ADVANTAGES OF STAR DELTA STARTER

•The operation of the star-delta method is simple and rugged.
•It is relatively cheap compared to other reduced voltage methods.
•Good torque/current performance.
•It draws 2 times starting current of the full load ampere of the motor connected.

FEATURES OF STAR DELTA STARTER:-

•For low- to high-power three-phase motors.
•Reduced starting current
•Six connection cables
•Reduced starting torque
•Current peak on changeover from star to delta
•Mechanical load on changeover from star to delta

WORKING DETAIL SEMI AND FULLY AUTOMATIC STAR DELTA STARTER
AUTOMATIC CHANGE OVER SWITCH(ATS)

One of the most commonly used circuit in power networks is change over switch circuit which transfer the power flow from the main power source to be stand by source which may be generator set. There are two types of change over switch the first one is manual and second one is automatic operated. Figure shows the power circuit of change over switch consists of two mechanically interlocked contactors. CM for the main source and CG for the generator
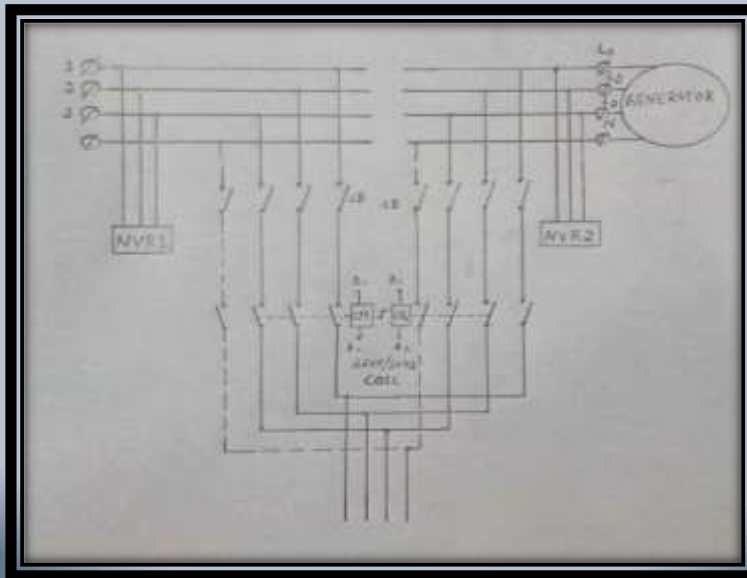

Figure shows the circuit used to control the power transfer from the main circuit to the generator. The default case is that the loads 1S connected to the main source CM is connected, but if at least one of phases is lost, the control circuit will change the state that is the loads should be transferred to the generator via CG contactor. Control circuit diagram for a change over switch

ADVANTAGES OF STAR DELTA AUTOMATIC STARTER WITH TIMER:

•Simple design and operation.

•Comparatively cheaper than other voltage controlling methods.

•Torque and current performance of the star delta starter is well.

•It draws two times starting current of the FLA (Full Load Ampere) of the connected motor.

•It reduced the starting current to one-third (approximately) as compared to DOL (Direct on Line Starter).

INDUSTRIAL APPLICATION OF STAR STARTER

•Star delta is categorize as a reduce voltage method educed voltage methods are intended to reduce the impact of motor starting current on the power system by controlling the voltage that the motor sees at the terminals.

•Common application which require controlling the starting current or torque can be found in many industries including material handling, HVAC, mining, and waste water treatment where the main application fans, pumps, conveyors, and compressors.

•This circuit allows the motor starter to initially connect the leads in the star connection for stating. And then reconnect them in the delta configuration for running this method is usually employed on motor's rated below 600v. Motors rated 2.3kv and higher are usually employed not suitable for star-delta starting. In term of power, it is suitable for motor rated above 7.5HP (5.5kw).

•Fans can be either directly connected to the motor or belted. Fans that are belted usually require torque control during starting to eliminate reduce excessive belt wear as a result of slippage during across the line starting.

•Pumps have low starting torque profiles. The initial torque and acceleration torque can be critical in some pumping application and is usually determined by the design of the pump. Some pump such as those with long shafts connecting the motor to the pump, may be damaged if the starting torque is too high.

•Some types of compressors need low torque to accelerate to full speed reciprocation compressors require high starting torque especially starting under load. Other types such as centrifugal and axial vane type require low starting torque because of the design characteristics.

•The need to limit the inrush current may due to government mandates, power company restrictions distribution system limitation, or operation in areas that are adjacent to or within a residential area may need to limit current during starting to eliminate voltage drops that cause light flicker.

•A good example of this is on pumps for hydraulic elevators in an apartment complex. These pumps have low starting torque requirements, so limiting current during starting minimizes any line sags that would have occurred if the pump was started direct on line.

Wiring of the kit and panel after assembling

CONCLUSION:

As evident from the above discussion, a star delta starter trainer kit can be used to limit the large starting current which plays a important role in protection of the 3 phase motors and bimetallic OLR's are provided to protect the faults in the supply.

Technical paper
SENSOR BASED AUTOMAETIC SOLAR STREET LIGHTING

[1] Ranjith Rathod   [2] Javeed Ahemad   [3] Tanveer.R

[1]Lecturer   [2], [3] Students

[1],[2], [3] Department of Electrical and Electronics, Sanjay Gandhi polytechnic. Ballari

INTRODUCTION:

Solar street lighting is based on the conversion of sunlight into electricity, either directly using photovoltaic, or indirectly using concentrated solar thermal power plant. Photovoltaic converts light into electric current using the photoelectric effect. Concentrated solar thermal power plants first appeared in the 1980's. Concentrated solar power system use lenses or mirrors and tracking systems to focus a large area of sunlight into a small beam. All in one sensor based automatic solar street lamp with lithium battery with automatic sensing moment of human being.

Green energy comes from natural sources such as sunlight, wind, rain, tides, plants, algae and geothermal heat. These energy resources are renewable, meaning they're naturally replenished. In contrast, fossil fuels are a finite resource that take millions of years to develop and will continue to diminish with use. Renewable energy sources also have a much smaller impact on the environment than fossil fuels, which produce pollutants such as greenhouse gases as a by-product, contributing to climate change. Gaining access to fossil fuels typically requires either mining or drilling deep into the earth, often in ecologically sensitive locations. Green energy can replace fossil fuels in all major areas of use including electricity, water and space heating and fuel for motor vehicles.

Solar Power - The most prevalent type of renewable energy, solar power is typically produced using photovoltaic cells, which capture sunlight and turn it into electricity. Solar energy is also used to heat buildings and water, provide natural lighting and cook food. Solar technologies have become inexpensive enough to power everything from small hand-held gadgets to entire neighbourhoods.

Worldwide growth of photovoltaic:-

The worldwide growth of photovoltaic is extremely dynamic and various strongly by country by the end of 2016, cumulative photovoltaic capacity increased by more than 75 gigawatt (GW) and reached at least 303GW, sufficient to supply1.8% of the world's total electricity consumption.

The top installers of 2016 were china, the United States and India. There are more than 24 countries around the world with a cumulative PV Capacity of more than one gigawatt. Austria, Chile, and south Africa all crossed the one gigawatt-mark in 2016 the available solar PV capacity in Honduras is now sufficient to supply 12.5% of the electrical power while Italy, Germany and Greece can produce between 7% and 8% of their respective domestic electricity consumption, As of January 2017, the largest solar power plants in the world are the 850MW longyangxia dam solar park in china for PV and the 377MW ivanpah solar power facility in the United States for csp. other large csp facilities include the 354 megawatt (MW) solar energy generating systems power installations in the USA.


Working Principle of Photovoltaic Effect:-

Conversion of light energy in electrical energy is based on a phenomenon called photovoltaic effect. When semiconductor materials are exposed to light, the some of the photons of light ray are absorbed by the semiconductor crystal which causes significant number of free electrons in the crystal. This is the basic reason of producing electricity due to photovoltaic effect. **Photovoltaic cell** is the basic unit of the system where photovoltaic effect is utilized to produce electricity from light energy. Silicon is the most widely used semiconductor material for constructing photovoltaic cell. The silicon atom has four valence electrons. In a solid crystal, each silicon atom shares each of its four valence electrons with another nearest silicon atom hence creating covalent bond between them. In this way silicon crystal gets a tetrahedral lattice structure. While light ray strikes on any materials some portion of light is reflected, some portion is transmitted through the materials and rest is absorbed by the materials.

Same thing happens when light falls on silicon crystal. If the intensity of incident light is high enough, sufficient numbers of photons are absorbed by the crystal and these photons in turn excite some of the electrons of covalent bonds. These excited electrons then get sufficient energy to migrate from valence band to conduction band. As the energy level of these electrons is in conduction band they leave from the covalent bond leaving a hole in the bond behind each removed electron. These are called free electrons move randomly inside the crystal structure of the silicon.These free electrons and holes have vital role in creating electricity in **photovoltaic cell**. These electrons and holes are hence called **light-generated electrons and holes** respectively. These light generated electrons and holes cannot produce electricity in the silicon crystal alone. There should be some additional mechanism to do ` electrons of each pentavalent phosphorous atom are shared through covalent bond with four neighbour silicon atoms and fifth valence electron does not get any chance to create covalent bond.
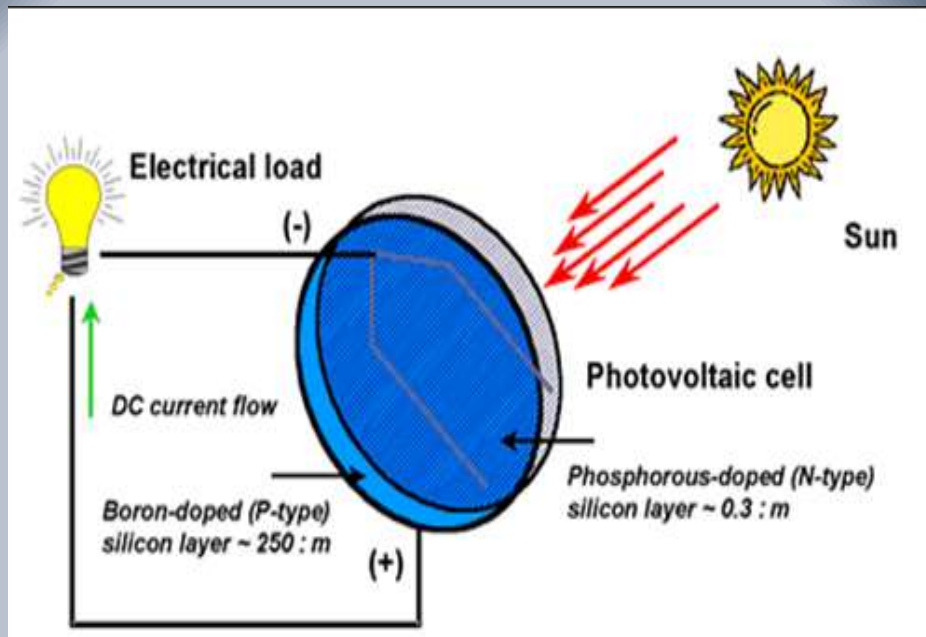
This fifth electron then relatively loosely bounded with its parent atom. Even in room temperature the thermal energy available in the crystal is large enough to disassociate these relatively loose fifth electrons from their parent phosphorus atom. While this fifth relatively loose electron is disassociated from parent phosphorus atom, the phosphorous atom immobile positive ions. The said disassociated electron becomes free but does not have any incomplete covalent bond or hole in the crystal to be re-associated. These free electrons come from pentavalent impurity are always ready to conduct current in semiconductor. Although there are numbers of free electrons but still the substance is electrically neutral as the number of positive phosphorous ions locked inside the crystal structure is exactly equal to the number of the free electrons come out from them. The process of inserting impurities in the semiconductor is known as doping and the impurities are doped are known as dopants. The pentavalent dopants which donate their fifth free electron to the semiconductor crystal are known as donor. The semiconductors doped by donor impurities are known as n-type or negative type semiconductor as there are plenty of free electrons which are negatively charged by nature.
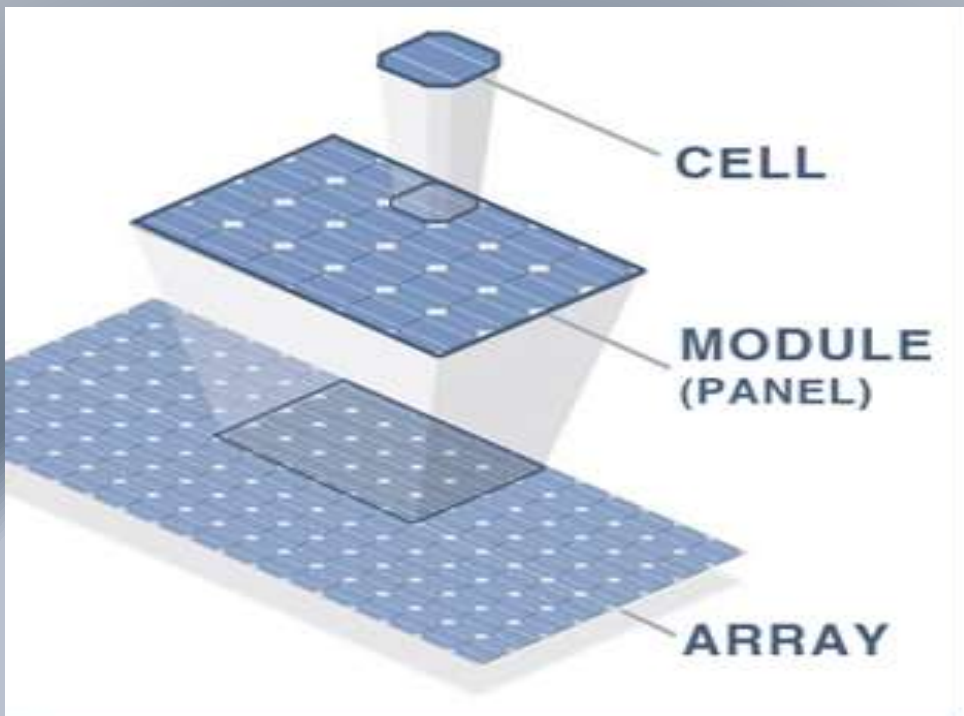
Solar street lamp

All In One Solar streets light use a PIR motion sensor to adjust the LED light brightness intelligently. On detecting any movement in 12m radius around the light, the LED glows at full brightness. If no movement is detected for more than 1 minute, the brightness is reduced to one-third. This intelligent brightness control coupled with maintenance free Lithium-ion or Lithium Ferro Phosphate battery technology provides longer backup time and better battery life.

Due to its compact size, this light can be easily mounted on pole top by anyone. The light has automatic dusk to dawn operation and needs negligible maintenance once installed. The All In One Solar Street light uses high quality material and is designed for Indian environments. It even gives indication to the user that the Solar panel is dirty and needs to be cleaned.

Advantages

• Solar street lights are independent of the. Hence, the operation costs are minimized.
• Solar street lights require much less maintenance compared to conventional street lights.
• Since external wires are eliminated, risk of accidents are minimized.
• Electricity produced from solar panels is non-pollutive.
• Separate parts of a solar panel system can easily be transported.
• Energy costs can be saved.

ERECTION OF POLE
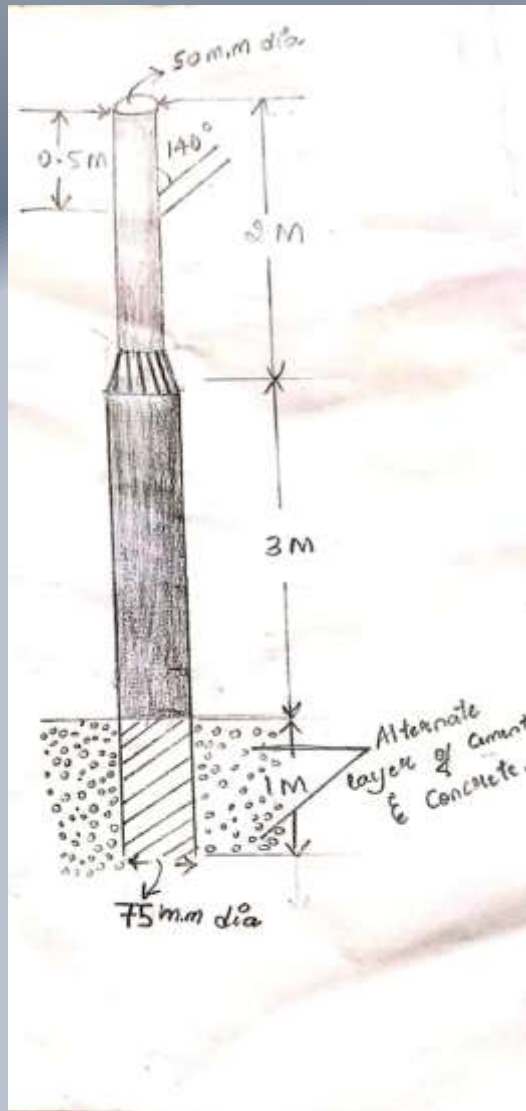
- The steel pole is used to support the solar light
- The pole is made up of mild steel
- Steel pole of size 75mm diameter and 50mm diameter along with 75mm to 50mm reducer of mild steel pole combination
- 3inch steel pipe of 4meter and 2inch steel pipe of 2meter
- The pole is fixed in pit of 1m length
- From the top of reducer the solar lamp is inclined with an angle of 140^0 at 0.5m from top
- The lamp carrying pipe has 30mm diameter
- Then after the pit is filled with and alternate layer of cement and concrete.

Specification of solar street lamp

- Wattage -30w
- Solar panel-poly crystalline 6v,15w
- Lithium battery-3.2v ,18Ah
- LED quantity-60 pcs
- Sensors-distance6-8m,detection angle>140^0
- Turn on and off-lamp by remote control
- Charging time- 8hrs under strong sun light
- Discharging time – 2-3cloudy and rainy days
- Charging conditions-0^0+50^0c
- Discharging conditions- -10^0c-$+50^0$
- Installation distance-5-8meter
- Installation height-4-5meters

CONCLUSION

From this project we observe that the solar panel is producing electricity free of cost by using solar energy so, its eco-friendly, pollution free and it is using for street lighting. The sun's energy has enough power to meet the energy need to the world. Incentives or utilise to promote solar power but more incentive should promote solar power better. The project entitled "All in One Solar Street Light" mainly gives an idea in saving power consumption by various devices in any field. Since it can switch automatically in reference to real time it doesn't waste power. Usually most of the street lights run on the power generated by several power plants using lots of