International Journal of Psychosocial Rehabilitation, Vol. 23, Issue
05, 2019 ISSN: 1475-7192

Improvisation of Inverter for Industrial Applications

[1]Tapas Ranjan Mahapatra, [2]Satis Chaudhary

Abstract--- *An inverter is basically an electronic device, which converts low voltage DC power to AC electrical power of 230 volts. They are utilized for applications such as laptops, microwaves, X-ray machine, satellite systems etc. Most modern applications needs high voltage power supply and high frequency. These expanded power prerequisites have lead to noteworthy advancement in modified innovation. An inverter is an electrical device that changes over DC to AC; the converted AC can be of desired voltage and frequency with the utilization of proper transformers, exchanging control circuits. The inverter plays out the contrary operation of a rectifier.*

Index Terms: *Electromechanical Inverter, Solid State Inverter, Inverter, Grid Tie Inverter, Power Inverter, Conventional CCFL Inverter.*

I. INTRODUCTION

From late 19th century over the centre of the 20th century, DC to AC power transformation was practiced utilizing rotational converters or engine generator sets. In the mid twentieth century, vacuum cylinders and gas filled cylinders started to be utilized as switches in inverting networks. The most generally utilized sort of cylinder was the thyratron[1].

The inceptions of electromechanical inverters clarify the wellspring of term inverter. Early AC to DC converters utilized an acceptance or synchronous AC engine legitimately associated with a generator so the generator's commutator turned around its associations at precisely the privilege minutes to deliver DC[2].

Inverters can be utilized in various applications. The utilization can shift from little applications in a PC to enormous modern buildings which require mass power. An inverter is fundamentally a rationale entryway that changes over contribution to yield and those two are in inverse state. It suggests that whenever info is false at that point yield is valid and the other way around[3].

Inverters are defined using output waveforms: i) Square wave, ii) Modified sine wave and iii) True sine wave.

II. METHODOLOGY

- Important development had been performed for traditional pulse width modulations inverters for making power distribution system more effective and more appropriate for reactive powers compensators and harmonic filtering[4].
- Solid state inverters has no moving parts and being utilized in a wide range applications from small to large. Said inverters are basically utilized to supply AC power from DC sources like batteries or solar panel[4].
- A subsequent improvement is a synchronous converter that is designed with the combination of motor and generator winding with single armature, through commutator at one end and slip rings at another end with single field frame. The outcome with

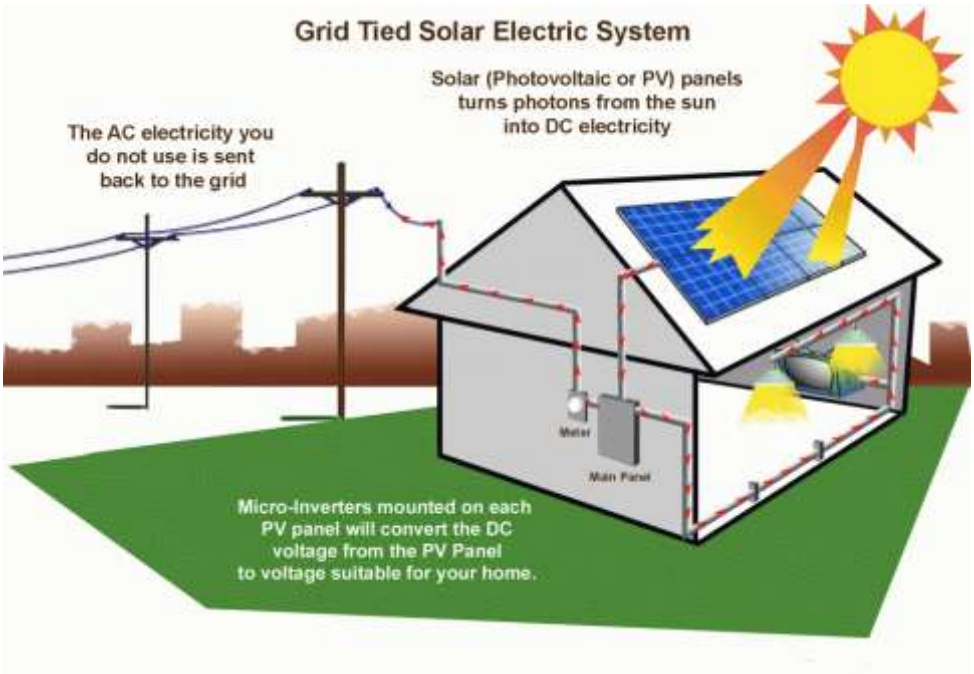
Department of Engineering, Siksha 'O' Anusandhan (Deemed to be University), Bhubaneswar.
tapasmohapatra@soa.ac.in, satishchoudhury@soa.ac.in

Received: 10 Nov 2018 | Revised: 20 Dec 2018 | Accepted: 02 Jan 2019

either is AC-in, DC-out. Through a M-G set, the DC can be considered as separately generated from said AC; through a synchronous converter, into definite logic it can be deliberated to the "mechanically rectified AC"[5].

- Since early transistors were not accessible with adequate voltage and current appraisals for most inverter applications, it was the 1957 presentation of the thyristor or silicon-controlled-rectifier that started the change to strong state inverter circuits[6].
- A power inverting converts DC power into AC power[7].
- A PV inverter or solar inverter is examples of electrical inverters that built for converting DC of PV array into AC for home purposes or utility grids.

- **Grid tie inverters:** Numerous solar inverters are associated to said utility grid, and cannot operate whenever it does not detects the presence of said grid. They contains different integrated circuit for appropriate matching of frequency and voltage of said grid[8].

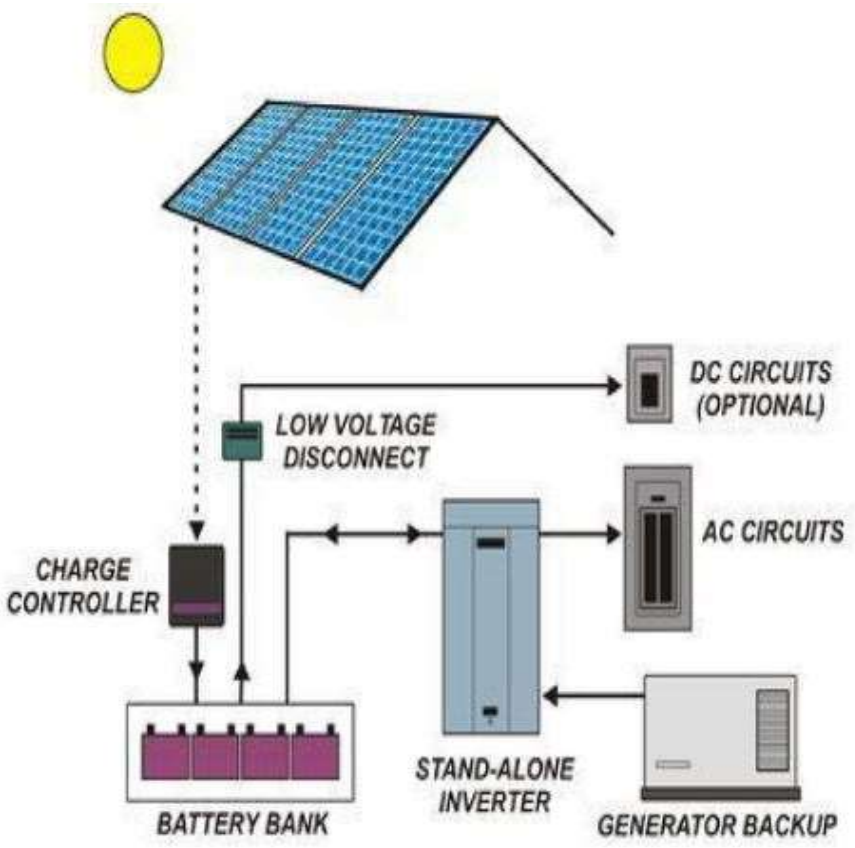


- **Solar power inverters:** The solar inverter accomplishes the variable DC output of PV cells into sinusoidal 50 or 60 Hz current[9].
- **Conventional CCFL inverter:** A CCFL inverter provides driving power into a cold cathode fluorescent lamp. CCFLs are often utilized as economical lightning units in electrical devices[10].

Received: 10 Nov 2018 | Revised: 20 Dec 2018 | Accepted: 02 Jan 2019

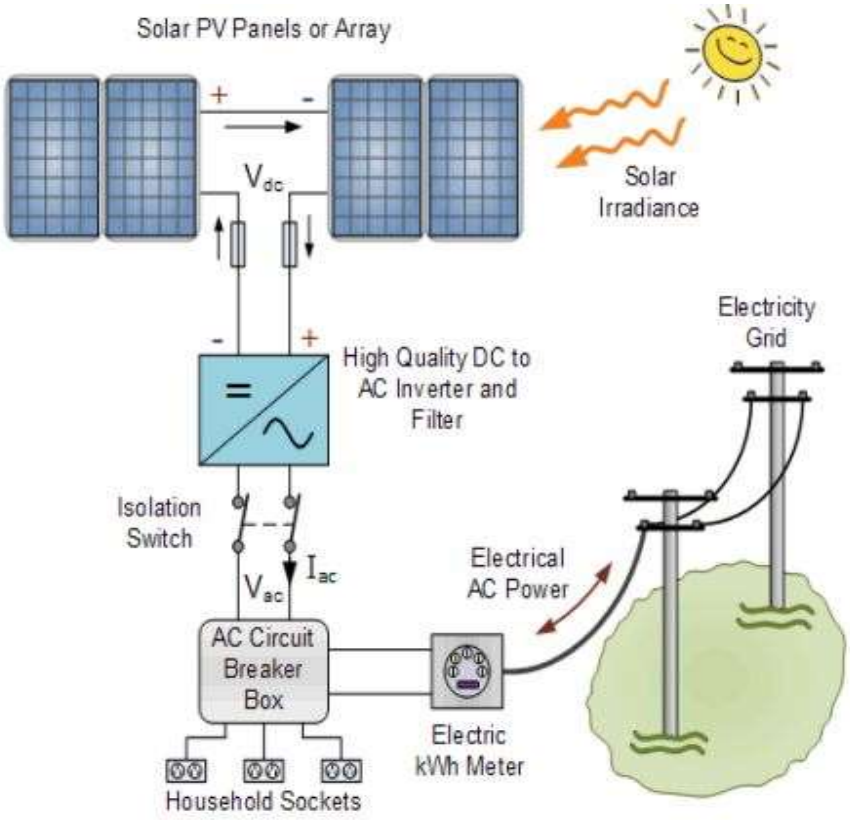
III. RESULTS

- Inverters certifies a continuous power supply. They are capable of varying sizes as per capacity. Inverters can be of single switching as well as double switching modes of power supply[11].
- The inverter have the ability of improving the DC power into AC power, which are beneficial for producing apparatuses such as computers, household items, power tools etc. by plugging devices into inverters.
- OFF GRID: Supply generated or stored power exclusively with associated loads.



- GRID TIE: Permits stored or generated power to be supplied into utility's distributing circuit whenever not required by said load[12].

Received: 10 Nov 2018 | Revised: 20 Dec 2018 | Accepted: 02 Jan 2019



- Inverter are designed for optimizing transfer of power by DER into load, often using a technology called MPPT.
- A main element of an inverter is the ability of constructing an output AC waveform that is synchronised with distribution system[13].
- At fault situation are available, a grid associated inverter is needed for disconnecting through the distribution system at common point of coupling[14].
- An inverter can allow the incorporation of battery or other energy storage device through a dispersed generator.
- Capable of supplying or absorbing reactive power.
- Capable of controlling and modulating voltage and frequency.
- Capable of providing induced heating.

1. CONCLUSIONS

This paper is studied for some current and pioneering inverters technology. These technology has been deliberated for network designs, enactment constraints, improved characteristics, converting outlines, variation arrangements, practical possibility and critical applications in research and firms. The square wave inverter is more efficient than that of sine wave inverter because of its non-complexity. The power inverter as power source defines that the output AC having similar frequency to the power supply.

REFERENCES

[1] M. Malinowski, K. Gopakumar, J. Rodriguez, and M. A. Perez, "A survey on cascaded multilevel inverters," IEEE Transactions on Industrial Electronics. 2010.
[2] H. Abu-Rub, J. Holtz, J. Rodriguez, and G. Baoming, "Medium-voltage multilevel converters State of the art, challenges, and requirements in Industrial applications," IEEE Trans. Ind. Electron., 2010.
[3] V. Esteve et al., "Improving the reliability of series resonant inverters for induction heating applications," IEEE Trans. Ind. Electron., 2014.
[4] W. Wu, Y. He, T. Tang, and F. Blaabjerg, "A new design method for the passive damped LCL and LLCL filter-based single-phase grid-tied inverter," IEEE Trans. Ind. Electron., 2013.

Received: 10 Nov 2018 | Revised: 20 Dec 2018 | Accepted: 02 Jan 2019

[5] Y. Li, S. Jiang, J. G. Cintron-Rivera, and F. Z. Peng, "Modeling and control of quasi-z-source inverter for distributed generation applications," IEEE Trans. Ind. Electron., 2013.
[6] R. J. Wai, C. Y. Lin, Y. C. Huang, and Y. R. Chang, "Design of high-Performance stand-alone and grid-connected inverter for distributed generation applications," IEEE Trans. Ind. Electron., 2013.
[7] G. Waltrich and I. Barbi, "Three-phase cascaded multilevel inverter using power cells with two inverter legs in series," IEEE Trans. Ind. Electron., 2010.
[8] E. Najafi and A. H. M. Yatim, "Design and implementation of a new multilevel inverter topology," IEEE Trans. Ind. Electron., 2012.
[9] J. F. Ardashir, M. Sabahi, S. H. Hosseini, F. Blaabjerg, E. Babaei, and G. B. Gharehpetian, "A Single-Phase Transformerless Inverter with Charge Pump Circuit Concept for Grid-Tied PV Applications," IEEE Trans. Ind. Electron., 2017.
[10] B. D. Reddy, M. P. Selvan, and S. Moorthi, "Design, operation, and control of s3 inverter for single-phase microgrid applications," IEEE Trans. Ind. Electron., 2015.
[11] J. S. Lim, C. Park, J. Han, and Y. Il Lee, "Robust tracking control of a three-phase DC-AC inverter for UPS applications," IEEE Trans. Ind. Electron., 2014.
[12] P. Kala and S. Arora, "A comprehensive study of classical and hybrid multilevel inverter topologies for renewable energy applications," Renewable and Sustainable Energy Reviews. 2017.
[13] N. Vázquez, H. López, C. Hernández, E. Vázquez, R. Osorio, and J. Arau, "A different multilevel current-source inverter," IEEE Trans. Ind. Electron., 2010.
[14] O. Ellabban and H. Abu-Rub, "Z-Source Inverter: Topology Improvements Review," IEEE Ind. Electron. Mag., 2016.

Received: 10 Nov 2018 | Revised: 20 Dec 2018 | Accepted: 02 Jan 2019