REVIEW OF SOLAR ENERGY BASED REDUCED SWITCH MULTILEVEL SPWM INVERTER

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Abstract: Now a day solar energy is very popular, therefore this energy is connected to grid. The main aim of this paper, which produces lesser harmonic in advanced inverter topology the inverter, contains SPWM&H-Bridge inverter. In advanced sinusoidal PWM number of switching operation is $1/4^{Th}$of UPWM &BPWM. Multilevel inverter compared with advanced inverter. Multilevel inverter used six switches but advanced inverter used four switches, therefore advanced inverter produces sinusoidal output voltage and current waveform. If compare between UPWM & SPWM switching method. The SPWM switching method reduces the total harmonic and increases the efficiency of inverter. The advanced inverter model implemented by PIC16F72A and result is verified on MATLAB.

Keywords---H-bridge inverter, Maximum power point tracking, and sinusoidal pulse width modulated (SPWM) switching.

I. INTRODUCTION

Recently few years, global issue is improved because of greenhouse effect and these generate due to conventional energy sources. Conventional energy sources are reduced in future. Therefore, cost of conventional energy is more expensive. Hence solar energy is more essential reduce global issue. Also solar energy is more important for residential compact capacity application in coming years.

Photovoltaic cell array produces DC output which convert into AC power then this AC power send to the utilization grid. Inverter use to convert Direct current power into alternating current power. Almost UPS supply used in residential application. This UPS produces square wave not suitable for residential applications. UPS produces more losses and lowers the efficiency. These losses reduced by placing sinusoidal pulse width modulation switching. The SPWM switching operated by continues switching in inverter. Advanced inverter model implemented by using SPWM Switch. This SPWM switching character given by amplitude pulse modulation and different duty cycle for individual period .the H-bride also used in advanced inverter. H-bridge topology used for boost the voltage levels and increases efficiency and lesser the harmonic count.

The advanced inverter containing SPWM Switch, H-bridge of parallel connected, MPPT, Transformer The more efficient and harmonic count are less than other inverter.

II. LITERTURE REVIEW

1. Weimin Wu Have developed new model power filter higher order inverter. Model name is LLCL filter and this connected to grid. The small inductor connected with branch loop capacitor in LCL filter. And another model of resonant circuit produces switching frequency. The resonant circuit of switching frequency reduced ripple component than the LCL filter. Single phase 1.8KW inverter implemented and its characteristic compared to LCL filter .this proposed LLCL filter inverter resulted factor reduced 81.67% and modulation index is 0.9[1]

2. K.Srinivasulu Have designed nine level inverter models which consist of DC-DC power converter and nine level inverter The Paper aim to lesser the power loss and improved efficiency with less number of switching. When compare with cascade H-Bride inverter output. The nine level inverter used 0.7 solar cell and connected to MPPT algorithm and this& O algorithm used for residential application. [2]

3. Nisha Xavier Has designed seven level inverter by using photovoltaic cell. The system proposed consists of PWM switches and DC-DC converter .this system uses six electronic switches. The output of this system generates sinusoidal current which in phase with utility voltage or current.PWM of two power stages reduces switching losses. The main object of paper to reduce switching losses and increase efficiency [3]

4. Monali P. Samarth Has designed new model of inverter. It consists of SPWM novel and multilevel inverter. The single phase photovoltaic cell generation system connected to grid. The new model of inverter reduces harmonic by using SPWM novel. Their control actions adjust grid frequency along inverter frequency. In paper percentage of total harmonic distortion reduces grid current along with increases irradiance. Hence, the new inverter topology sends the power in good condition. [4]

5. A. Abrishamifar Have developed sliding mode control for single phase unipolar inverter. This inverter has high stability and strong controller for ample range operation. Unipolar inverter deteriorates chattering issue. This issue can be eliminated by smoothing control law and PWM switching. The PWM generate fixed frequency inverter. The new inverter used 6-KVA model .the main aim of this paper to reduce harmonic of output voltage >1.1% and 1.7% peak of linear load. [5]

6. *Jun Mei* has designed phase deposition pulse width modulation inverter. The inverter not used extra allowance signal .It is depend upon selective loop mapping to resulted voltage balance changing capacitor. This balance voltage resulted by dynamic loop mapping. The large number of sub module used in one capacitor arm. The PDPWM inverter gives good regulation and control. [6]
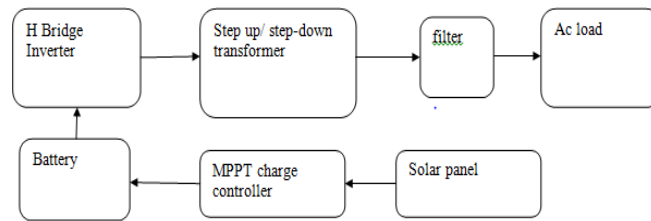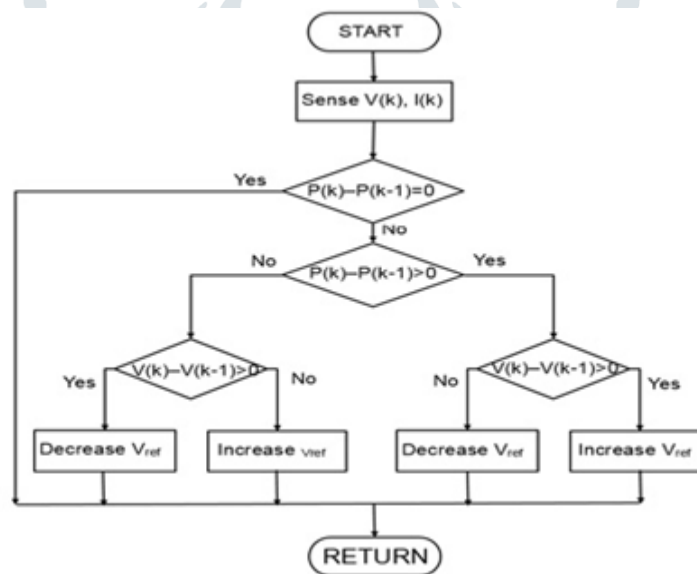
III. METHODOLOGY

Fig.1.Block diagram of Inverter

Solar panel made by each photovoltaic cell connected each other and this solar panel also called solar module.therefore, the number of solar module connected by wire to form a solar array.the photovoltaic cell or panel covert 35 to 45 % of sun irradiations incident on panel into direct current electricty.from fig.1 this solar panel connected to MPPT/charge controller.MPPT operated in algorithm.charge controller means which improve the efficiency of solar panel. MPPT used to track maximum extracted power from sun rays.this DC energy stored in the battery.and then this power is feed to H-bridge inverter of four switches convert into DC to AC energy. This AC energy produces less harmonic and more efficieny dut to SPWM switch and wich send to step up transformer and then given to the grid.the advanced inverter implemented by reduced switch multilevel sinusodial wave.

IV. MPPT(MAXIMUM POWER POINT TRACKING) AND FLOWCHART

Solar panel of I-V and P-V characteristcs not linear also output efficiency are not better.therefore.MPPT used to track maximum librated power from sn rays.and improves efficiency of solar module. Lots off algotithms areapply in MPPT but mostly used P&O algorithm.

The perturbation and observation start working and sensed all voltage and current of solar module. The next operation of power which is reproduced given to solar module. If output power increased because of increasing solar current also increases reference current or decrease the reference current. The output power decreased because of increasing solar current also decreased reference current or increased reference current therefore, P&O algorithm send this increased power or reversed direction. Hence, this process continuously worked and track maximum power any condition and improves efficiency of solar module.

V. PROJECT ACCESS

An inverter is not easily implemented. This is possible when component of inverter divided into different parts. The advanced inverter generates 240V pure sine wave by using H-Bridge inverter.
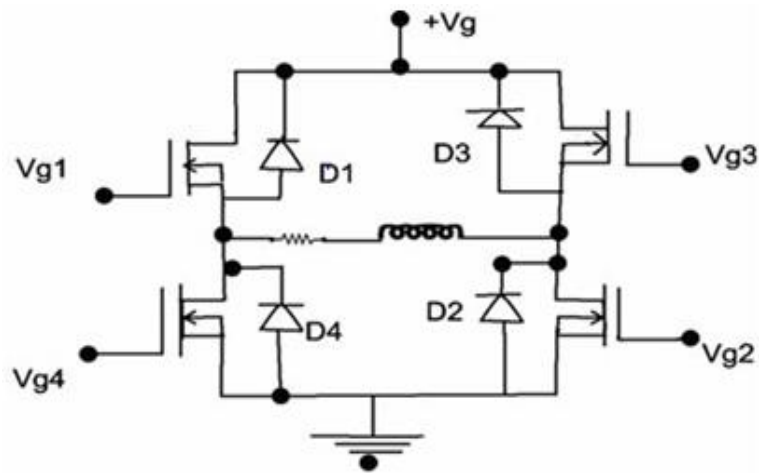
Fig.2. H-bridge Inverter

Fig.2 shows H-bridge inverter. This inverter consists of four switches of MOSFET. It is similar to full bridge converter. The output voltage is Positive, negative, zero. The operation given by table .When switch S1& S2 are closed and S3 & S4 are opened then obtained voltage is positive. In other case when switch S1& S2 are opened and S3 & S4 are closed the obtained voltage is negative. For similar operation of switch S1 & S4 are both closed to obtain short circuit means zero voltage same for switch S2 & S3.

S1	S2	S3	S4	Vo
ON	ON	OFF	OFF	+Ve
OFF	OFF	ON	ON	-Ve
ON	OFF	ON	OFF	ZERO
OFF	ON	OFF	ON	ZERO

VI. CONCLUSION

The advanced inverter implementation used solar module, SPWM switch, H-bridge, MPPT (P&O) algorithm. An inverter use four switches and generate pure sine wave. This also reduces total harmonic count and improves efficiency of Output voltage feed to utility grid.

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