

Multi-Level Inverter Based on Solar Power Generation System



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ABSTRACT:

This paper proposes another sun oriented force era framework, which is made out of a DC/DC power converter and another seven-level inverter. The DC/DC power converter coordinates a DC-DC support converter and a transformer to change over the yield voltage of the sunlight based cell exhibit into two free voltage sources with various connections. This new seven-level inverter is designed utilizing a capacitor determination circuit and a full-connect power converter, associated in course. The capacitor choice circuit changes over the two yield voltage wellsprings of DC-DC power converter into a three-level DC voltage and the full-connect power converter further changes over this three-level DC voltage into a seven-level AC voltage. Along these lines, the proposed sun oriented force era framework creates a sinusoidal yield current that is in stage with the utility voltage and is encouraged into the utility. The remarkable components of the proposed seven-level inverter are that exclusive six force electronic switches are utilized and stand out force electronic switch is exchanged at high recurrence whenever. A model is produced and tried to confirm the execution of this proposed sun based force era framework.

I. INTRODUCTION:

The broad utilization of fossil powers has brought about the worldwide issue of nursery emanations. Besides, as the supplies of fossil powers are exhausted later on, they will turn out to be progressively costly. Along these lines sunlight based vitality is turning out

to be more critical since it delivers less contamination and the expense of fossil fuel vitality is rising, while the expense of sun oriented clusters is diminishing. Specifically, little limit dispersed force era frameworks utilizing sun powered vitality might be generally utilized as a part of private applications sooner rather than later [1, 2]. The force transformation interface is essential to framework associated sun powered force era frameworks since it changes over the DC power created by a sun based cell exhibit into AC power and bolsters this AC power into the utility matrix. An inverter is important in the force change interface to change over the DC energy to AC power [2-4]. Since the yield voltage of a sunlight based cell exhibit is low, a DC-DC power converter is utilized as a part of a little limit sun oriented force era framework to support the yield voltage so it can coordinate the DC transport voltage of the inverter.

The force change productivity of the force transformation interface is vital to protect there is no misuse of the vitality created by the sun based cell exhibit. The dynamic gadgets and inactive gadgets in the inverter create a force misfortune. The force misfortunes because of dynamic gadgets incorporate both conduction misfortunes and exchanging misfortunes [5]. Conduction misfortune results from the utilization of dynamic gadgets, while the exchanging misfortune is corresponding to the voltage and the present changes for every exchanging and exchanging recurrence. A channel inductor is utilized to handle the exchanging sounds of an inverter, so the

force misfortune is corresponding to the measure of exchanging harmonics. The voltage change in every exchanging operation for a multi-level inverter is lessened keeping in mind the end goal to enhance its energy transformation productivity [6-15] and the exchanging anxiety of the dynamic gadgets. The measure of exchanging sounds is likewise constricted, so the force misfortune brought on by the channel inductor is additionally lessened. Thusly, multi-level inverter innovation has been the subject of much research in the previous couple of years. In principle, multi-level inverters ought to be planned with higher voltage levels so as to enhance the change productivity and to decrease symphonious substance and electromagnetic impedance (EMI). Customary multi-level inverter topologies incorporate the diode-clasped [6-10], the flying-capacitor [11-13] and the course H-span [14-18] sorts. Diode-braced and flying-capacitor multi-level inverters use capacitors to build up a few voltage levels. Be that as it may, it is hard to direct the voltage of these capacitors. Since it is hard to make a deviated voltage innovation in both the diode-cinched and the flying-capacitor topologies, the force circuit is muddled by the expansion in the voltage levels that is vital for a multi-level inverter.

For a solitary stage seven-level inverter, twelve force electronic switches are required in both the diode-clipped and the flying-capacitor topologies. Topsy-turvy voltage innovation is utilized as a part of the course H-span multi-level inverter to permit more levels of yield voltage [17], so the course H-span multi-level inverter is reasonable for applications with expanded voltage levels. Two H-span inverters with a dc transport voltage of various connections can be associated in course to create a solitary stage seven-level inverter and eight force electronic switches are utilized. All the more as of late, different novel topologies for seven-level inverters have been proposed. For instance, a solitary stage seven-level matrix associated inverter has been created for a photovoltaic framework [18]. This seven-level lattice associated inverter contains six force electronic switches. In any case, three dc capacitors are utilized

to develop the three voltage levels, which results in that adjusting the voltages of the capacitors is more intricate. In [19], a seven-level inverter topology, designed by a level era part and an extremity era part, is proposed. There, just power electronic switches of the level era part switch in high recurrence, however ten force electronic switches and three dc capacitors are utilized. In [20], a particular multilevel inverter with another tweak strategy is connected to the photovoltaic network associated generator. The particular multilevel inverter is like the course H-span sort. For this, another adjustment strategy is proposed to accomplish dynamic capacitor voltage equalization. In [21], a multilevel dc-join inverter is introduced to beat the issue of incomplete shading of individual photovoltaic sources that are associated in arrangement. The dc transport of a full-connect inverter is designed by a few individual dc squares, where every dc piece is made out of a sun based cell, a force electronic switch and a diode. Controlling the force hardware of the dc pieces will bring about a multilevel dc-join voltage to supply a full-connect inverter and to at the same time beat the issues of halfway shading of individual photovoltaic sources.

This paper proposes another sun based force era framework. The proposed sunlight based force era framework is made out of a DC/DC power converter and a seven-level inverter. The seven-level inverter is designed utilizing a capacitor choice circuit and a full-connect power converter, associated in course. The seven-level inverter contains just six force electronic switches, which streamlines the circuit design. Since one and only power electronic switch is exchanged at high recurrence whenever to create the seven-level yield voltage, the exchanging power misfortune is decreased and the influence proficiency is progressed. The inductance of the channel inductor is additionally lessened in light of the fact that there is a seven-level yield voltage. In this study, a model is created and tried to confirm the execution of the proposed sun oriented force era framework.

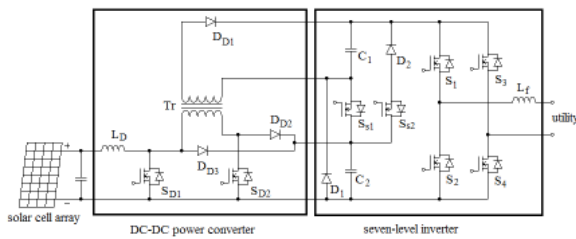


Fig. 1 configuration of the proposed solar power generation system.

Existing System:

The force transformation productivity of the force era framework. The proposed sun powered force era framework is made out of a sunlight based cell exhibit, a DC-DC power converter and another seven-level inverter. The sunlight based cell exhibit is associated with the DC-DC power converter, and the DC-DC power converter is a help converter that fuses a transformer with a turn proportion of 2:1. The DC-DC power converter changes over the yield force of the sun powered cell exhibit into two autonomous voltage sources with different connections, which supply the seven-level inverter. This new seven-level inverter is made out of a capacitor choice circuit and a full-connect power converter, associated in course. The force electronic switches of capacitor determination circuit decide the release of the two capacitors while the two capacitors are being released separately or in arrangement. In view of the various connections between the voltages of the DC capacitors, the capacitor choice circuit yields a three-level DC voltage. The full-connect power converter further changes over this three-level DC voltage to a seven-level AC voltage that is synchronized with the utility voltage. Along these lines, the proposed sunlight based force era framework.

Proposed System:

As found in Fig. 1, the DC-DC power converter fuses a help converter and a present bolstered forward converter. The support converter is made out of an inductor, LD, a force electronic switch, SD1, and a diode, DD3. The support converter charges capacitor C2 of the seven-level inverter. The present sustained forward converter is made out of an inductor, LD, power electronic switches, SD1 and SD2, a

transformer and diodes, DD1 and DD2. The present nourished forward converter charges capacitor C1 of the seven-level inverter. The inductor, LD, and the force electronic switch, SD1, of the present sustained forward converter are likewise utilized as a part of the help converter. Figure 2(a) demonstrates the working circuit of the DC-DC power converter when SD1 is turned on. The sun oriented cell exhibit supplies vitality to the inductor LD. At the point when SD1 is killed and SD2 is turned on, its working circuit is appeared in Fig. 2(b). As needs be, capacitor C1 is associated with capacitor C2 in parallel through the transformer, so the vitality of inductor LD and the sun based cell exhibit charge capacitor C2 through DD3 and charge capacitor C1 through the transformer and DD1 amid the off-condition of SD1. Since capacitors C1 and C2 are charged in parallel by utilizing the transformer, the voltage proportion of capacitors C1 and C2 is the same as the turn proportion (2:1) of the transformer.

Securely determining own location:

In mobile environments, self-localization is mainly achieved through Global Navigation Satellite Systems, e.g., GPS, whose security can be provided by cryptographic and non cryptographic defense mechanisms. Alternatively, terrestrial special purpose infrastructure could be used along with techniques to deal with non honest beacons. We remark that this problem is orthogonal to the problem of NPV. In the rest of this paper, we will assume that devices employ one of the techniques above to securely determine their own position and time reference.

Seven-Level Inverter:

As found in Fig. 1, the seven-level inverter is made out of a capacitor determination circuit and a full-connect power converter, which are associated in course. Operation of the seven-level inverter can be partitioned into the positive half cycle and the negative half cycle of the utility. For simplicity of investigation, the force electronic switches and diodes are thought to be perfect, while the voltages of both capacitors C1 and C2 in the capacitor determination circuit are steady

and equivalent to $V_{dc}/3$ and $2V_{dc}/3$, separately. Since the yield current of the sun based force era framework will be controlled to be sinusoidal and in stage with the utility voltage, the yield current of the seven-level inverter is additionally positive in the positive half cycle of the utility. The operation of the seven-level inverter in the positive half cycle of the utility can be further separated into four modes, as appeared in Fig.3.

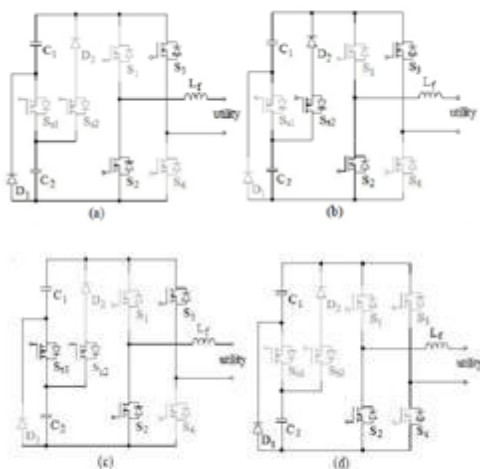


Fig. 4 operation of seven-level inverter in the negative half cycle, (a) mode 5, (b) mode 6, (c) mode 7, (d) mode 8.

Experimental Results:

To verify the performance of the proposed solar power generation system, a prototype was developed with a controller based on the DSP chip TMS320F28035. The power rating of the prototype is 500W, and the prototype was used for To confirm the execution of the proposed sun oriented force era framework, a model was produced with a controller taking into account the DSP chip TMS320F28035. The force rating of the model is 500W, and the model was utilized for a solitary stage utility with 110V and 60Hz. Table II demonstrates the fundamental parameters of the model.

Conclusion:

This paper proposes a sunlight based force era framework to change over the DC vitality created by a sun powered cell cluster into AC vitality that is nourished into the utility. The proposed sun oriented force era framework is made out of a DC/DC power

converter and a seven-level inverter. The seven-level inverter contains just six force electronic switches, which disentangles the circuit design. Besides, one and only power electronic switch is exchanged at high recurrence whenever to produce the seven-level yield voltage. This diminishes the exchanging power misfortune and enhances the influence productivity. The voltages of the two DC capacitors in the proposed seven-level inverter are adjusted naturally, so the control circuit is disentangled. Exploratory results demonstrate that the proposed sunlight based force era framework produces a seven-level yield voltage and yields a sinusoidal current that is in stage with the utility voltage, yielding a force variable of solidarity. What's more, the proposed sun based force era framework can adequately follow the most extreme force of sun based cell clusterr a single-phase utility with 110V and 60Hz. Table II shows the main parameters of the prototype.

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