A STRUCTURE FOR REDUCING THE HARMONIC SURGES

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Abstract - *However, weight, size, and price connected using the transformer could make this type of solution undesirable. This paper proposes just one-phase to 3-phase drive system made up of two parallel single-phase rectifiers, a 3-phase inverter, as well as an induction motor. This method might be also employed in our situation to lessen the entire inductance needed to have an sufficient operation from the system. For example, if your fault in almost any switch of rectifier A continues to be detected through the control system, the opening rectifier must be isolated. The suggested topology permits to lessen the rectifier switch power, the harmonic distortion in the input ripper tools side, and presents enhancements around the fault tolerance qualities. Despite the rise in the amount of switches, the entire energy lack of the suggested system might be lower compared to a standard one. The suggested product is created to function in which the single-phase utility grid may be the unique option available. The type of the machine comes, which is proven the decrease in circulating current is a vital objective within the system design. A appropriate control strategy, such as the pulse width modulation technique (PWM), is developed. Experimental answers are presented too.*

Key Words*: *Ac-dc-ac power converter, drive system, parallel converter

1.INTRODUCTION : Single-phase to 3-phase ac-electricity-ac conversion usually utilizes a complete-bridge topology, which suggests in ten power switches. This ripper tools is denoted because conventional topology. Parallel converters happen to be accustomed to enhance the power capacity, reliability, efficiency, and redundancy [1]. Parallel ripper tools techniques can be used to enhance the performance of active power filters, uninterruptible power supplies (UPS), fault tolerance of doubly given induction machines, and three-phase drives. Usually the whole process of converters in parallel needs a transformer for isolation. However, weight, size, and price connected using the transformer could make this type of solution undesirable. Several solutions happen to be suggested once the objective would be to supply three-phase motors from one-phase ac mains [2]. It is extremely present with only have just one phase power company in residential, commercial, manufacturing, and mainly in rural areas, as the adjustable speed drives may request a 3-phase power company. When an isolation transformer sits dormant, the decrease in circulating power among different ripper tools stages is a vital objective within the system design. Within this paper, just one-phase to 3-phase drive system made up of two parallel single-phase rectifiers along with a three-phase inverter is suggested. The suggested product is created to function in which the single-phase utility grid may be the unique option available. In comparison towards the conventional topology, the suggested system permits: to lessen the rectifier switch power the entire harmonic distortion (THD) from the grid up-to-date with same switching frequency or even the switching frequency with same THD from the grid current and also to boost the fault tolerance qualities.

Additionally, the deficits from the suggested system might be lower compared to the traditional counterpart. These benefits justify the first investment from the suggested system, because of the increase of quantity of switches.

II. SYSTEM MODEL

The machine consists of grid, input inductors (La , L_ a , Lb. , and L_b), rectifiers (A and B), capacitor bank in the clink, inverter, and induction machine. Then, the type of the suggested system becomes much like what system made up of two conventional independent rectifiers. The inverter could be commanded while on an sufficient pulse width modulation (PWM) technique for three-phase current source inverter (VSI), to ensure that it won't be talked about here. Within this section, the PWM technique for the rectifier will be provided [3]. The rectifier circuit from the suggested system has got the same objectives of this to manage the electricity-link current and to be sure the grid power factor near to one. Furthermore, the circulating current io within the rectifier from the suggested system must be controlled. In this manner, the electricity-link current vc is modified to the reference value v* c while using controller Rc , that is a standard PI type controller. This controller offers the amplitude from the reference grid current I* g . To manage power factor and harmonics within the grid side, the immediate reference current i* g should be synchronized with current eg , as succumbed the current-oriented control (VOC) for 3-phase system The homopolar current is measured (io) and in comparison to the reference (i* o =). The mistake may be the input of PI controller Ro that determines the current. The harmonic distortion from the ripper tools voltages continues to be evaluated using the weighted THD (WTHD). Once the single-carrier PWM can be used, the behavior of WTHD from the suggested system is comparable to those of conventional one for those μ, as observed. Aside from the total harmonic distortion (THD) from the grid current ig , connected towards the WTHD from the current vab , the harmonic distortion analysis should also think about the power within the rectifiers. It is really an important issue because of deficits from the ripper tools [4]. Presuming same rms voltages at both grid and machine sides, a piece of equipment power factor of .85 and neglecting the ripper tools deficits, power from the rectifier switches normalized when it comes to power from the inverter switches are 2.55 and 1.27 for that conventional and also the suggested single-phase to 3-phase ripper tools, correspondingly. You'll be able to lessen the second order harmonic created by single-phase operation, but this isn't of great interest since it requires unbalancing and growing rectifier power. The PW with double-carrier strategy cuts down on the WTHD from the resultant rectifier current vab. Once the input inductors from the suggested topology (L_ g) are comparable to those of the traditional topology (Lg), the decrease in the THD from the grid current is directly indicated. In almost any situation, using additional common-mode inductors is an extremely joyful manner of lessen the harmonic distortion of those power. This method might be also employed in our situation to lessen the entire inductance needed to have an sufficient operation from the system. For example, if your fault in almost any switch of rectifier A continues to be detected through the control system, the entire rectifier must be isolated. This isolation procedure is dependent around the type of fault

detected. If the open-circuit failure is detected, the control system will open all switches from the rectifier A. However, if your short circuit is detected, the control system will switch on all switches associated with rectifier A, as well as in this situation, the fuses will open, and therefore, the rectifier is going to be isolated, as talked about. Thinking about now a fault in a single leg of inverter, within this situation the SCR related to this leg in switched on and also the leg b1 is isolated, so the leg b2 of rectifier B will operate because the leg of inverter [5]. The first investment from the suggested product is greater compared to the conventional one, since the amount of switches and products for example fuses and tests is greatest. But, thinking about the scenario when problems can happen, the drive operation must be stopped for any non-designed maintenance schedule. The price of this schedule could be high which justifies our prime energy production natural of fault-tolerant motor drive systems.

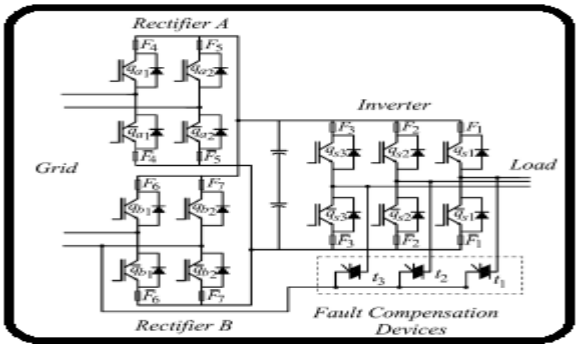
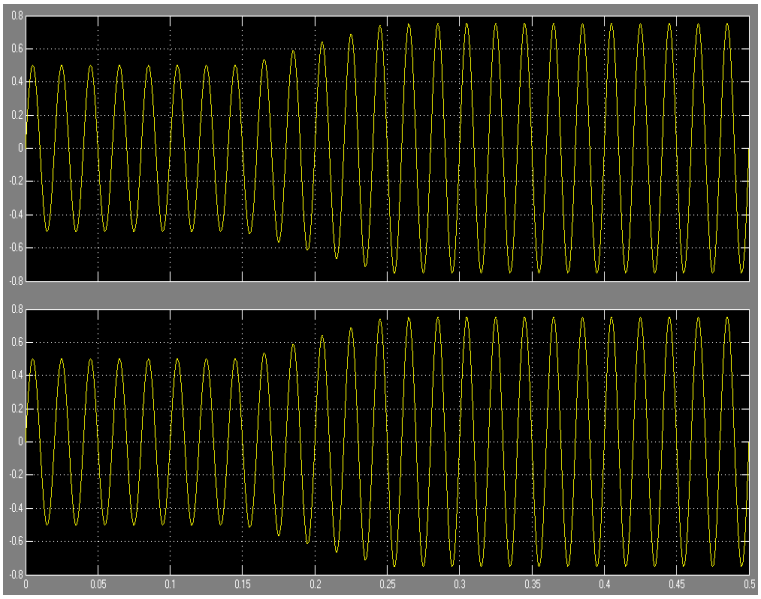


Fig.1.Proposed system Framework

III. CONCLUSION

The suggested system may be used within the same programs because the conventional configuration, particularly when the THD from the grid current, fault tolerance and efficiency of ripper tools are critical issues. The machine combines two parallel rectifiers without using transformers. The machine model and also the control strategy, such as the PWM technique, happen to be developed. The entire comparison between your suggested and standard designs continues to be transported in this paper. In comparison towards the conventional topology, the suggested system permits to lessen the rectifier switch power, the THD from the grid up-to-date with same switching frequency or even the switching frequency with same THD from the grid current and also to boost the fault tolerance qualities.



3.1.Output waveforms

The experimental results have proven the product is controlled correctly, despite transient and occurrence of problems. Just one-phase to 3-phase drive system made up of two parallel single-phase rectifiers, a 3-phase inverter as well as an induction motor was suggested. Additionally, the deficits from the suggested system might be lower compared to the traditional counterpart. The first investment from the suggested system (because of large number of semiconductor products) cannot be described as a drawback,

especially thinking about the scenario in which the reported advantages justify such energy production.

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