

SINGLE PHASE TO THREE PHASE CONVERTER

In India, we found in most of the rural areas electricity is not available till date. If electricity is available then it is in single phase form and if three phase supply is available, it is for less time. Most of the agricultural equipments work on the three phase supply like pumping machine. It is not possible for the farmer to provide water to each and every crop in the farm within specific time. So we will build mechanism which helps us to resolve this problem. The task of conversion of single phase supply to three phase supply is carried out during the following conditions

- When only single phase supply is available.
- When No power supply is available.
- When renewable energy as well as single phase supply both are present.

- 1) In India most of the villages have only single phase supply. So we have to convert that single phase supply into the three phase supply. By using induction motor field, we will convert single phase supply into three phase and it is provided to the pumping machines. By using this mechanism we can provide three phase supply to other equipment.
- 2) Another situation is when we have no power supply then we can use renewable energy. We can use solar energy and convert it into electrical energy and the energy is stored in battery. But it has also limitations solar power is available only in daytime and it also gets affected by weather.
- 3) When both single phase supply and solar energy is available then we can use switching circuit to convert single phase supply into three phase supply. This switching circuit helps us to switch between single phase supply and battery.

For this mechanism we use the following hardware

- 1) Rectifier Circuit:- Rectifier circuit to convert single phase AC voltage into DC voltage. There are two types of rectifier circuit one is half wave and other is full wave rectifier. Diode Bridge is an arrangement of four diodes in a bridge configuration that provide the same polarity of output for either polarity of input.
- 2) Boosting Circuit:- A boost converter is sometimes called setup up converter, it typically operates by switching one or more semiconductor switches ON and OFF to set up the source voltage up to higher output

voltage which can be used by the load. Parallel connection of two or more conventional boost converters is called an interleaved boost converter.

CONVENTIONAL BOOST CONVERTER:

In electrical power supplies, transforming DC voltages from one level to another is often achieved by using a conventional nonisolated DC-DC power converter.

These converters work to transform input DC voltages to output DC voltages at desired level and have two modes of operation.

- Continuous current mode
- Discontinuous current mode

3) Three phase Inverter circuit :- It helps us to convert DC voltage obtained from a boosting circuit to the required three phase voltage by induction motor and load.

Conversion of Single phase supply into three phase supply:

- Static phase converter:- Static phase converter operates by charging and discharging of capacitors to temporarily produce a three phase power for only a matter of seconds during startup of electric motors, then it will drop out forcing the motor to continue to run on just 1 phase and only part of its winding's.
- Rotary phase converter:- A rotary phase converter abbreviated RPC is an electrical machine that produces three phase electrical power from single phase electric power. In this, the three phase loads are allowed to run using generator or utility supplied single phase electric power. A rotary phase converter may be built as a motor generator set. The advantageous point is that in isolating the generated three phase power from the single phase supply and balancing the three phase output. Reliable, balanced, and efficient three phase power is provided by Rotary Phase Converters. It gives Quick and effective three phase electricity.

These converters have further applications like in electric locomotives for operating auxiliary pumps and fans from the single phase traction supply. These converters are an excellent choice for situations where three phase power is not available. Such converters have a wide range of applications in which three phase motor is the main component and available supply is single phase.

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