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IJIEMR Transactions, online available on 30th April 2021.

Link: <https://ijiemr.org/downloads/Volume-10/Issue-4>

**DOI: 10.48047/IJIEMR/V10/I04/102**

Title: **THREE-PHASE INVERTER WITH QUASISINUSOIDAL OUTPUT VOLTAGE**

Volume 10, Issue 04, Pages: 504-505

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## THREE-PHASE INVERTER WITH QUASISINUSOIDAL OUTPUT VOLTAGE

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**Abstract:** This article discusses a developed three-phase inverter with a quasi-sinusoidal voltage, which converts a single-phase voltage of a household power grid into a three-phase voltage and allows you to change the frequency of the output voltage from 10-80 Hz. The developed device is intended for power supply of low-power three-phase electric motors.

**Keywords:** Three-phase inverter, asynchronous electric motor, quasi-sinusoidal voltage, output voltage frequency.

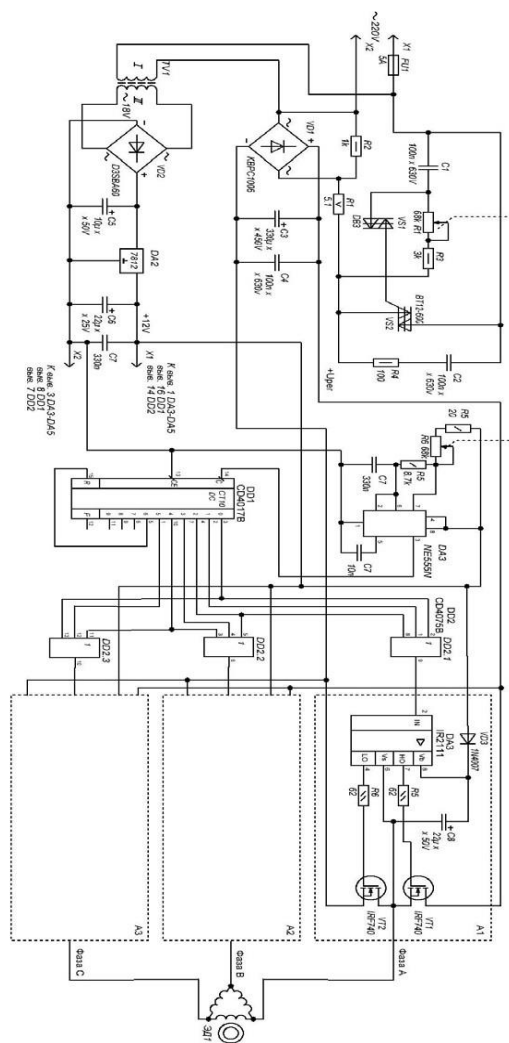
### Introduction

Asynchronous electric motors (AED) are the most common type of electric motor. AED is especially widespread as the main element of electric pumping units that are commonly used for irrigation of cultivated areas, both by large business entities and private entrepreneurs. At present, it can be stated that almost every family in rural areas uses at least one pumping unit, which is based on AED. Thus, we can conclude that electricity consumption in rural areas is largely determined by the efficiency of the pumping units used and the modes of their operation. This article presents a schematic diagram of the electronic device of the inverter, which makes it possible to significantly increase the service life of the AED, improve its efficiency and other technical and technical characteristics.

### Schematic diagram of a three-phase inverter with quasi-sinusoidal voltage.

Mains voltage (~ 200 V) is supplied to the phase power regulator assembled according to the classic triac circuit (VS1 and VS2) [1]. The voltage taken from the triac power regulator is rectified by the diode bridge VD1 and filtered by the electrolytic capacitor C3. Thus, the effective voltage across the capacitor C3 can be regulated over a wide range (from 0 to 311 V). The resulting constant voltage is applied to three half-bridges assembled on power MOSFET transistors (VT16) [2]. Power MOSFET transistors are controlled by three DA3-5 drivers [3], [4] (one for each bridge).

The DA3 master oscillator determines the frequency of the output voltage. The output voltage waveform is approximated by a stepped sine wave, which is achieved by logic chips DD1-2.



*Fig 1. Schematic diagram of the developed three-phase inverter with quasi-sinusoidal voltage*

In fig. 1 shows a schematic diagram of the developed three-phase inverter.

The outputted three-phase voltage must be linearly related to its frequency (function of the frequency converter). Variable resistors R1 and R6 are made in the same housing with a common shaft, thus, the voltage regulation of the output by the phase power regulator and the frequency of the master oscillator are linearly related, which ultimately is expressed in the linear dependence of the output three-phase voltage on its frequency.

## **Conclusion.**

The developed three-phase inverter allows feeding low-power three-phase motors and changing the output voltage frequency from 10-80 Hz.

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