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5P63 - Push-pull plasma power supply -combining techniques for increased stability

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The case which is being described regards the means of supplying a miniature plasma reactor. The matter concerns mainly the sliding arc discharge which is developed in the conditions of air or other gases that are difficult to ionize. From the ecological point of view, the discharge in the air as a plasma-creating gas is especially important, since it is currently widely used in the field of environmental protection.

Typically the gliding arc reactor is a receiver with a non-linear resistance characteristic and, even in high frequency, the share of capacity is irrelevant. Nonetheless, the conductivity of the receiver is much less linear. In order to fulfil the requirements of the power supply and at the same time provide appropriate ignition properties, efficiently limit the research current and obtain the stability of non-thermal discharge, many advanced techniques were used. The power supply is switched-mode and of high-frequency, which gives it maximum efficiency in the process of energy conversion.

Insulated gate bipolar transistors were used in the power supply in push-pull topology and what is extraordinary here is the transformer which consists of 5 double secondary coils. Another technique that was used here was the ignition improvement obtained in switching overvoltages that come from parasitic parameters in the circuit of the transformer and the primary current switching system. The features mentioned are exceptional for the power supply and provide a very high quality of operation in the supply and plasma generator system. There are very wide adjustment properties in the range of 13-26 kHz and it has been proven to be exceptionally efficient in fulfilling its purposes.

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