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OPTOELECTRONIC TWO- WAVE GAS ANALYZER

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Abstract
In clause is considered gas the analyzer on a basis optical electronic two-wave generator in which through the gas chamber is used optical feedback. At on an output of the generator a positive pulse the optical feedback on length to a wave λ_1 is provided and at negative - λ_2 .

Keywords: devices, two-wave generator, optoelectronic generator, photoresistor, pulse, spectral characteristic.

Introduction

With low requirements for control devices, you can use a simple scheme of an optoelectronic two-wave generator. Two-wave optoelectronic generators with two optocouplers can be successfully used to create portable gas analyzers for continuous monitoring of the degree of environmental pollution.

The structural gas chamber of the optoelectronic two-wave generator is a hollow tube (Fig. 1), the inner surface of which has good reflectivity. At one end of the gas chamber, semiconductor emitters SD1 and SD2 are installed, respectively, with radiation wavelengths and**,** and at the other end, a photoresistor FR is installed, the spectral characteristic of which allows recording radiation from both sources. The choice of the type of source with the corresponding and is determined by the spectral characteristics of the monitored gas component.

A schematic diagram of an optoelectronic two-wave generator is shown in Fig. 2. The principle of operation of the generator is based on the use of a photoresistor in the feedback circuit, which is optically coupled through a controlled medium with an LED connected in anti-parallel at the output of the generator.

In the absence of a controlled substance (gas, smoke, etc.), by turning the knobs of the variable resistors R_1 R_2 and selecting the divider R_4 and R_5 at the amplifier output, the pulse durations of positive and reverse polarities are equal.

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In the presence of a controlled substance, the pulse duration of one polarity changes. The duration of a pulse of a different polarity depends on the values of non-informative parameters, since the wavelength of this LED lies outside the absorption band of the controlled parameter.

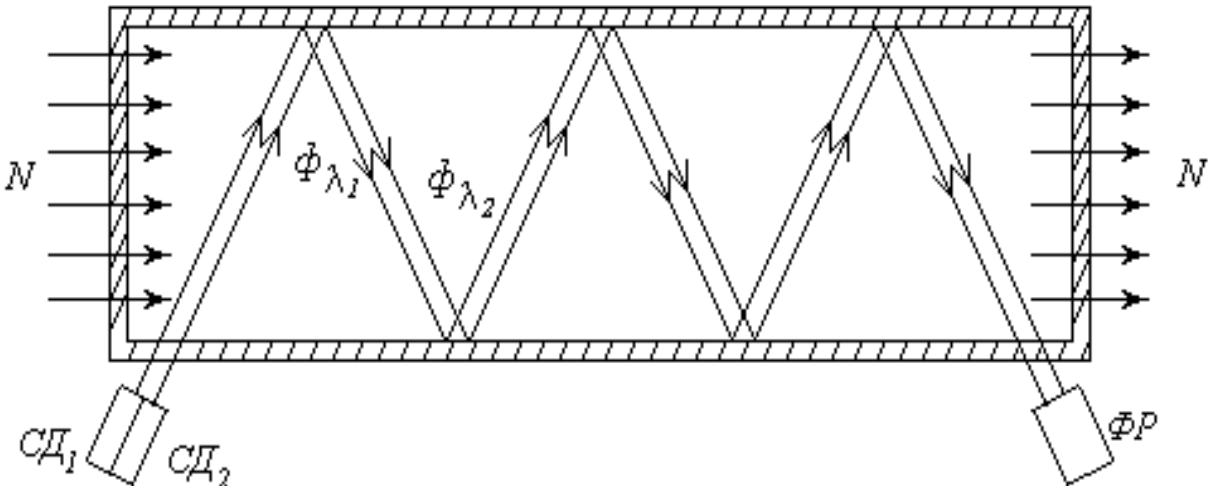

Fig. 1. The design of the gas chamber of the gas analyzer.

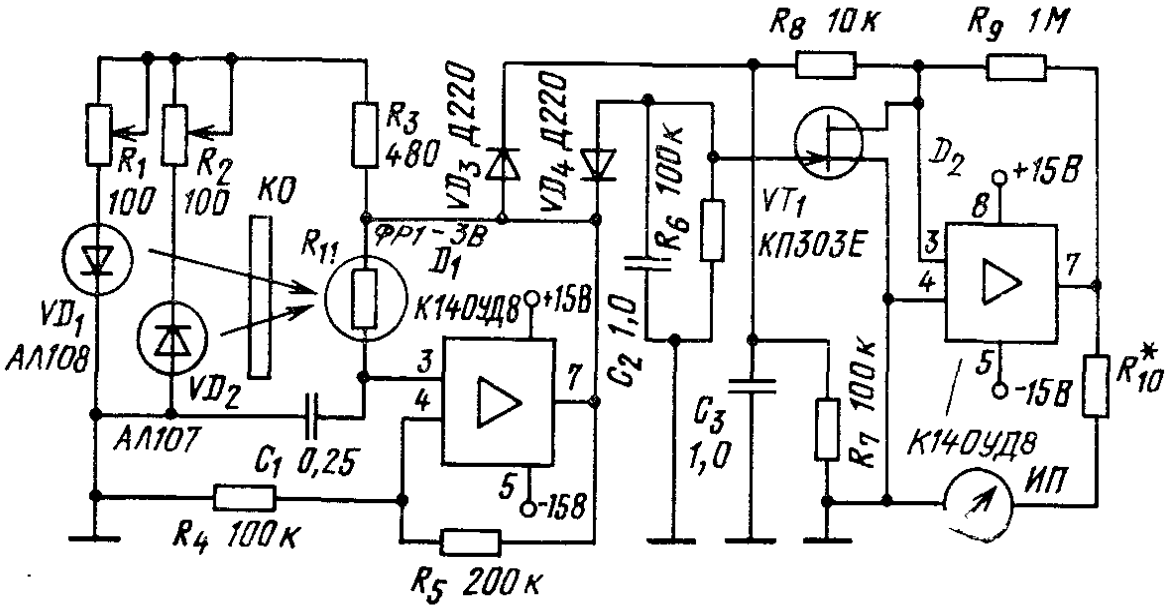

Fig. 2. Schematic diagram of a gas analyzer based on an optoelectronic two-wave

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Thus, the generator continuously generates a periodic sequence of rectangular pulses of different polarity. The duration of a pulse of one polarity, for example positive, depends on the controlled parameter, and the duration of a pulse of negative polarity depends on non-informative parameters (for example, when monitoring gas pollution, pollution, etc.). It should be noted that with a change in the background illumination and temperature, only the pulse repetition rate of the generator changes, and the ratio of the pulse durations of positive and negative polarities depends only on the value of the controlled parameter.

To implement the ratio of the durations of these pulses, a device made on a field-effect transistor VT_1 and an operational amplifier D_2 is connected to the output of the microcircuit D_1. The separation of pulses of negative and positive polarity is carried out by diodes VD_3 and VD_4. Further, the separated pulses are integrated by chains $R_6 C_2$ and $R_7 C_5$. The value of the monitored parameter is recorded by the measuring device MT.

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