

Abstract

Industrial Leak Detector based on mass spectrometer

The paper describes a leak detector for industrial applications developed as part of the implementation project.

It uses a modified magnetic mass spectrometer supplemented with an additional lens focusing ions after exiting the ion separator, a modified ion collector supplemented with an ion suppressor, a signal preamplifier from the ion detector, and a control and display module for device operation parameters.

Test studies have shown that the industrial leak detector developed as part of this project based on a modified mass spectrometer correctly responds to the increase in the partial pressure of He contained in the test (marking) gas, with, among others, the minimum measured leak threshold being at the level of $< 10^{-10}$ mbar·l/s, with the maximum pressure at the inlet of the measuring system < 15 mbar, and with a response time of < 1 s.

The obtained analytical parameters confirm that it can be fully used to check the leaks of selected industrial devices, especially technological ones. In accordance with the assumptions of the implementation project, as part of its implementation, the first copies of the industrial leak detector under the own name GLD10 were made (produced), which have already been tested by customers from the industrial sector, in particular the automotive industry.

After testing in industrial conditions, the GLD10 device was additionally refined in accordance with the user's wishes, including the GUI user interface of the control and steering device.