Understanding The Shinyei PPD24NS Low-Cost Dust Sensor

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Abstract

Air quality measurement is a topic of a great interest for any country due to health and environmental reasons. Tis issue is more critical in low-incomes countries since the air quality is generally worse than in developed countries and the governments give fewer budget to lead environmental policy and research. This explains the increasing demand for low-cost dust optical sensors like the Shinyei PPD24NS during the last years. However, those sensors present mixed results in terms of precision and repeatability, especially in case of new applications like the ones in moving context. Moreover, few or confuse information exists on those sensors functioning and conditions of use and the manufacturer does not provide any comprehensive guideline. The present article aims at filling this gap, providing a real study of the internal sensor operating. This includes: a detailed, theoretical and practical, analysis of the electric diagram, a characterization of the airflow through the optical chamber, an output behavior analysis based on particulate matter concentration and some algorithmic issues guideline. The article ends by providing useful tips and recommendations as well as some tracks to improve its precision for new applications.

Keywords

Air Quality; Dust Sensors; Low-Cost Sensors; Optical Sensors; Particulate Matter