NICA-MPD safety systems - oxygen level sensor

1. Introduction

When designing various types of systems, great emphasis should be placed on security issues. In the case of NICA-MPD (Nuclotron-based Ion Collider fAcility - Multi-Purpose Detector), one of the potential threats that may endanger the operator's life are gases such as, for example, nitrogen, which is used in, e.g., to cool the superconducting magnet. In the event of leakage from the cryogenic system, a scenario is possible in which nitrogen will displace oxygen from the room. Therefore, an inherent element of the safety system in the case of NICA-MPD is the placement of oxygen level sensors in the room. Sensors connected to the security system will detect such an event and enable the evacuation of personnel from the dangerous area.

2. Description

During the implementation of the topic, the student will learn about the SIMATIC S7 1200 or S7 1500 PLC controllers and the TIA Portal environment and standard analog signals used in measurement systems. The student will also gain practical skills in using tools to prepare cables. The student will read out the oxygen level from the oxygen transducer using a PLC and visualize the results using the HMI panel. The task includes making the necessary electrical connections and learning the basics of data conversion.



Figure 1. Oxygen level sensor

3. Prerequisites

• Basic electronics knowledge.

4. Recommended number of participants

1 participant

5. Supervisors

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