HSB
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Automation of I/O System Test with I/O Expansion Modules (Safety and Non-Safety Modules) and Industrial Ethernet Communication using Profinet.

ABSTRACT - Masterthesis

Automation has always been a trending topic as it replaces human methods into automatic actions and controls. Industry 4.0 is a boon as it has increased a wide range of information exchange using the digitization in Automation along with the real time communication.

The thesis aims to automate the test setup for the I/O system-test to reduce the human interaction and efforts and to ease the process. Automating the test setup helps in analyzing the possible risk factors and minimizes the chances of failure of the system. The I/O system-test includes tests like:

1=Power Up Behavior, 2= Switch-on/switch-off test, 3= Measurement of the reaction time, 4= Stability test, 5= Diagnostic check, 6= Accuracy test that determines the performance of the system. The System-test is carried out in order to check the functioning by analyzing the behavior using regression tests. The I/O system covers all the Safety and Non-safety I/O modules of ABB V2 product range.

It not only helps to determine the overall functionality of the system but also of individual modules. The communication between the modules is carried out by Profinet RJ 45 connector and a communication Profinet I/O module ABB CM 579 is connected to the CPU (ABB PLC) for the transfer of input/output data. Ethernet based protocol is used as a standard for industrial communication.

Profinet Real time communication is based on class B of IEEE802 standard where the communication is realized at the top of the MAC layer by using LAN network. The cycle time for Profinet communication is in the range of 10 ms. Codesys software by 3-S Gmbh is used for the programming, configuration and also for the development of Visualization. The automation of this test is carried out using Test Manager by Codesys. The whole process is automated using Batch and Command files. The result of the test is written in SD card which is inserted in ABB PLC and is in csv format.