Development of Multi-Axis Force Detector for 5-DOF Articulated Robot

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Robot give an opportunity for increasing the rapidity of manufacturing processes with fewer error levels. Most industrial robots in the use today, which are the articulated robot with numerically position controlled, still have a trouble for identifying the changes in its environments. This characteristic have created a limitation for the application of robot in the manufacturing processes that need the sense of force such as deburring, polishing, and precision assembly process. Multi Axis Force Detector System permit an articulation robot for detects the force at the end effectors in the x, y, and z direction relative to end effectors. In this research, the Multi Axis Force Detectors is specially designed for the RV-M1 5 Articulated Robot, one of the facilities in the Manufacturing Laboratory, Mechanical Engineering Departement University of Indonesia. The main device for force detection is the strain gage. Focuses on this research are in the mechanical transducer design, Wheatstone bridge configuration for optimum works of strain gage, signal conditioning, and data acquisition of Multi Axis Force Detector. There is also a trial for the prototype, to obtain the equation that converts the output voltage to force at the end effectors in x, y, and z directions; and analyze what actually take place in force detection processes. The trial section was using th calibrated mass.

Keywords: articulated robot, multi-axis force