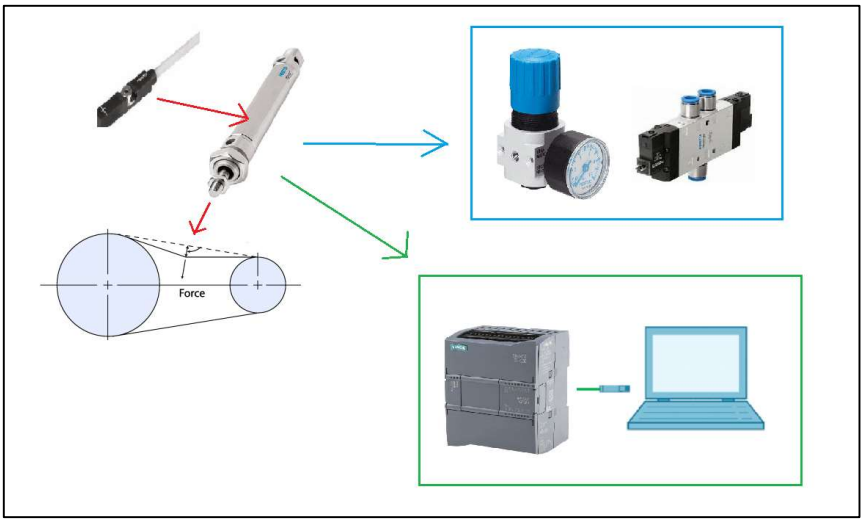
Automatic Belt Tension Checker

Industrial Pneumatics, Mechanical Design in PTC Creo/ProE, Electrical Wiring, PLC

Description:
This project was done during my internship at Dometic, which is an OEM that designs and manufactures steering systems for recreational boats. I was an intern in the Manufacturing Engineering team which is responsible for creating fixtures and semi-automated systems to assemble and test products on the production line.

On the assembly line for a particular product, a key task was to measure tension of a timing belt. The existing method was to use a sonic meter which requires "flicking" the belt to create vibration and the resulting vibration is measured by the sonic meter via the pressure waves created in air by the belt. This method was cumbersome, not very accurate, and operator dependent. Therefore, a new method needed to be implemented to check belt tension.

To improve this process, I developed a semi-automated system which used a pneumatic cylinder to check the belt tension. Essentially, the pneumatic cylinder applied a constant force on the belt, and the resulting deflection of the belt at the point of application was measured using an industrial position sensor. The deflection depended on the tension of the belt. Therefore, the belt tension could be measured by measuring the deflection for a constant force. The setup is illustrated in the image below.



Note: Due to confidentiality reasons, photos of the actual setup are not available for display.