

Automated Torquing Cell for Jeep Cherokee Trans Bridle Assembly “SPAZ”

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Abstract

The project proposed by Android Industries entailed designing and building an automated torquing cell. The cell will replace a repetitive manual operation and be integrated into an existing station to improve Android Industries delivery time. This automated torquing cell attaches the engine hoisting bracket to three different engine assemblies.

Introduction

To mitigate both ergonomic injuries related to repetitive operations and quality issues from improperly torqued bolts and cross threaded bolts, a torquing cell can be implemented into the assembly process to perform the final torquing requirements. The cell was developed and implemented into Android Industries' assembly plant in Belvidere Illinois. The torquing cell was designed and prototyped in SolidWorks before being manufactured, assembled, and implemented into Androids existing systems. The cell is pneumatically driven, controlled by a programmable logic controller. The design features three subassemblies: the motion mechanism, the control system, and the support structure.

Methods and Materials

Motion Mechanism: The motion mechanism was designed in Solidworks by designing the full cell around an engine mockup. The mechanism was then machined by the group members in the machine shop at NIU with a few parts being made by Android. The DC nut-runner assembly is made up of off the shelf components with custom made brackets attaching them together.

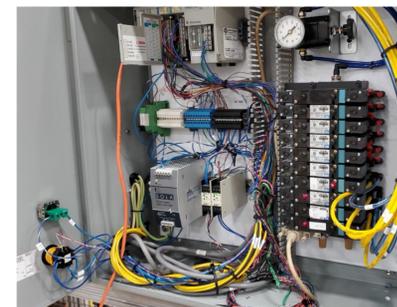


Control System:

The system is controlled by a programmable logic controller (PLC) using RLS Logix 5000. The control box contains the PLC, the power supply, an air manifold with a series of two-way air solenoid switches, relays, and circuit breakers. The system is programed to run for three different engine types.

Support Structure:

The support structure is made from 80-20 Aluminum and is designed to seamlessly integrate into androids existing support structures. The structure was designed for ample clearance and ensures maximize adjustability.



Implementation

The finished torque cell was delivered and installed at Android Industries in Belvidere, IL. With the help of Android Industries engineering technicians the automatic torquing cell is operational and works on all three engine assemblies



Conclusions

With the successfully delivery of the Automated Torquing Cell, Android Industries can allocate the manual labor to more complex tasks and improve their on-time delivery and production efficiency.

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