

# APPLICATION NOTE: 1746sc-INI4vi in the Automotive Industry



"A lot is riding on your tires" is a common phrase used by the automobile industry. This is often interpreted that there is more to an automobile than meets the eye. Spectrum Controls, with the help of Rockwell Automation distributor Kendall Electric, located in Indiana, found out the truthfulness of this statement.

Guide Engineering, a systems integrator in Fort Wayne, Indiana, designed a bearing installation system for Dana Corporation, a major automotive parts manufacturer. Dana Corporation supplies auto and truck differentials to Chrysler, Renault, Nissan, etc.

The application consists of a press system that aligns and inserts axle wheel bearings into the differential housing. These wheel bearings support the drive axles and brake assemblies. The bearings must be properly seated in the housing in order to function properly and insure long life. Alignment errors can result in premature bearing failures.



The machine consists of bearing alignment fixtures and press arms. The bearing is placed in the alignment fixture and the differential assembly is moved into place.

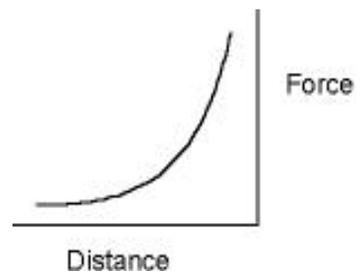


The press arms then insert the bearings into each axle tube housing.

Load cells are fixed to the bearing insertion arms. The load cell provides a linear force scale, based on an insertion pressure, which correlates to a bearing insertion distance. The load cells provide a 0 to 10 volt signal that is read by the Spectrum Controls 1746sc-INI4vi module.

The machine operator can view a plot showing force against distance as the bearing is inserted into the axle housing. Abnormalities in the plot can help to diagnose bearing alignment issues; insertion errors, bearing housing seating problems, and machine wear issues.

The PLC used in this process is an Allen-Bradley SLC-500 with Spectrum Controls' 1746sc-INI4vi four (4) channel isolated input module. The customer selected the 176sc-INI4VI particular module for the following features:



- 16-bit analog resolution - The high resolution allows the end user to view small changes in insertion force.

- On the fly configuration and enable/disable feature, handled without the need of circuit jumpers - Simplified module configuration minimizes system downtime should the system fail.
- Four selectable filter frequency settings for each channel - The machine resides in a high noise environment. The selectable filters allow the inputs to be tuned to minimize the effect of floor noise.
- 750V channel-to-channel isolation - There are a numbers of sources of electrical noise in the operating environment. Channel to channel isolation insures that signal cross talk does not effect module performance.

The harsh conditions of an assembly line are a challenging environment for PLC operation. Spectrum Controls I/O modules are designed for these types of environments. Features such as high levels of channel-to-channel isolation can save the day for the end-user.

***Spectrum Controls I/O modules offer a lot more than meets the eye.***