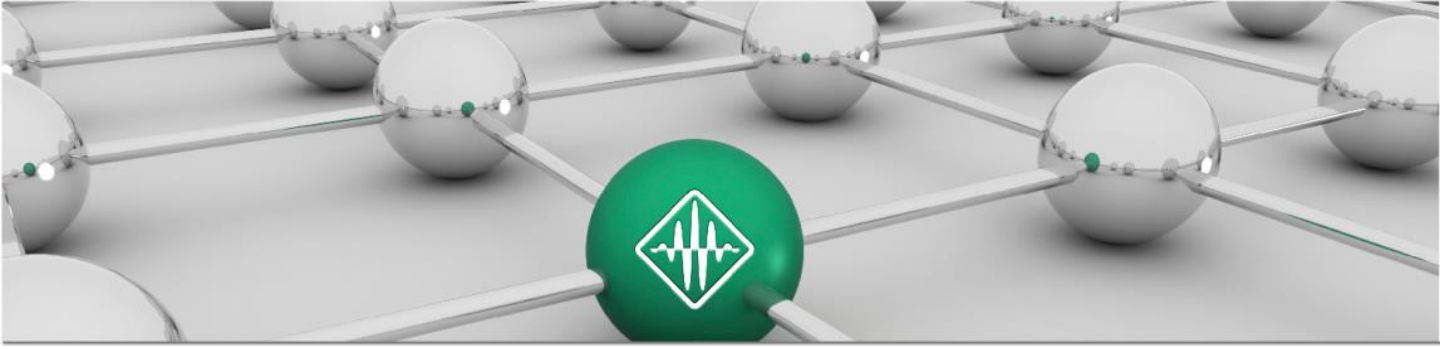


Signal.X TECHNOLOGIES LLC

We deploy software products and engineering services in the most demanding production and laboratory environments.

Application Spotlight: Half-Shaft Retention Check

Objectives:

In a development partnership with a major automotive OEM, Signal.X has created a new way to verify the manual task of half-shaft installation at vehicle final assembly, utilizing high-speed DAQ and real-time signal processing.

A hand-held sensor is attached magnetically to the half-shaft housing for quick and easy operator use.

Solution Benefits:

- Immediate verification that half-shaft snap-ring is fully seated
- Complete and clear job-done verification to operator with dual-color LED on a handheld sensor
- Entire system that is easy to integrate and takes up a small footprint online
- Standardized tool that is used to check multiple variations of half-shaft and transmission with programmable parameters

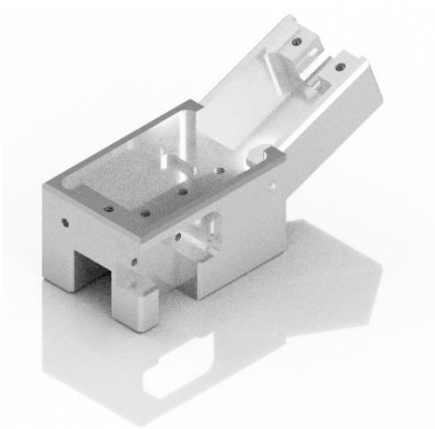
To learn more about this and other Signal.X projects, please visit signalxtech.com/about/portfolio/

Technology Highlights:

Pass / Fail Criteria

The test tool acquires high-speed accelerometer data during the installation process, and provides real-time signal analysis for a go / no-go determination. This determination is based on an algorithm that confirms whether the operator has completed the action of fully installing the half-shaft. The operator receives immediate feedback via a dual-color LED, and the assembly line receives the pass/fail status via DeviceNet.

High-speed accelerometer data is used to verify half-shaft installation.



Signal.X maintains 3D models of tool hardware for durability enhancements.

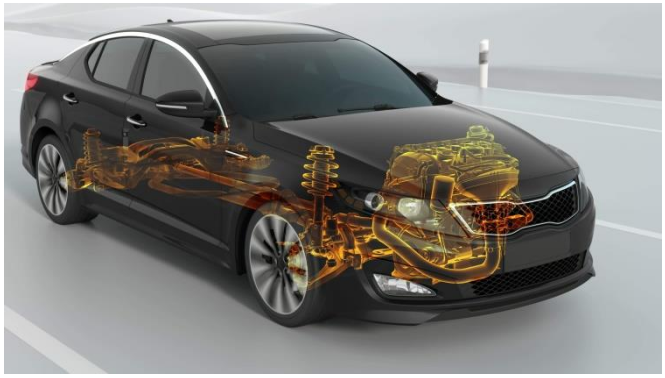
Designed for Durability

The handheld sensor is designed to be used hundreds of times each day in a demanding automotive manufacturing environment. The tool's hardware is managed in-house by Signal.X using 3D design software.

Designed for Adaptability

One common tool supports multiple vehicle platforms via:

- Programmable parameters tied to the plant error proofing system.
- A magnetic sensor interface to the test part, with a small footprint that supports both round and flat half-shaft housing designs.
- Multiple communication protocols, including digital I/O, Ethernet, and DeviceNet.



This test tool focuses on the vehicle assembly process, playing a critical role in quality control.

About Signal.X:

Since 2004, Signal.X has specialized in Test & Measurement Products for noise & vibration (NVH), production and laboratory test automation, functional test design, large data management, and custom application development.