

Automotive Tier 1 Supplier uses MTI's Laser System to Improve Torque Converter Design

Introduction

Improper operation of a torque converter can lead to poor performance, premature system failure or worse, compromise the operation of the entire vehicle drive line. Knowing the axial displacement and dynamic expansion characteristics of a torque converter provides engineers valuable information about the torque converters' performance.

A key automotive integrator was faced with the requirement of devising a foolproof method to accurately measure the axial displacement and dynamic expansion of production torque converters for a major Tier 1 automotive supplier. The measurement solution needed to be able to provide information under varying torque and pressure loads to accurately determine the performance under dynamic conditions.



MICROTRAK II Measuring Torque Converter Dynamic Expansion

The Problem

Since minute defects in the torque converter casing wall thickness can result in unacceptable and dangerous torque converter expansion, a precision measurement system was needed to measure the impeller hub displacement and thus the torque converter axial displacement.

An AC dynamometer would be required to spin the torque converter at a high rate of speed while a fast response hydraulic system is needed to pressurize the converter to pressures up to 150 psi.

The converter case, however, is not readily accessible and there is limited mounting room. So, a translation pin is needed to be affixed to the hub of the torque converter and a durable sensor is required to make the desired measurement.

The Solution

MTI Instruments' new Microtrak II laser sensor was selected because it offered a fast 20 kHz response time, a small visible laser spot for easy setup, and high accuracy. It also proved itself more than rugged enough to operate continuously and reliably in the dyno chamber's hostile environment.

Since the translation pin rotates at 7000 rpm, the fast response time of the Microtrak II laser enabled real time data capture. The Microtrak II's immunity to surface reflectivity changes on the surface of the pin ensured consistent and accurate growth data.

The Results

The Microtrak II's extreme stability coupled with its high accuracy helped the customer achieve rapid, consistent and reliable data from one torque converter casing to the next, facilitating the required design changes more quickly than ever before.

This resulted in a greater number of product samples of torque converters being able to be sampled at much higher speeds and with faster throughput. The Microtrak II laser sensor provided the customer accurate, repeatable and traceable results consistently.

The Microtrak II laser used was Model LTC-50-10, which offered a working distance of 50-mm and measurement range of 10-mm. MTI offers a broad range of other laser head models to solve even the most difficult application challenges.