



Measuring the Air Intake Temperature in Motorcycle Engines

Application

A worldwide automotive parts supplier needed a temperature sensor to install directly into a motorcycle engine manifold to measure the temperature of the air intake.

Background

In trying to keep up with emissions and fuel efficiency laws, bike manufacturers are relying more and more on fuel injection systems to help control the air-to-fuel mix ratio to minimize the emissions to the environment, as well as enabling the bike to run more efficiently. To accomplish optimal combustion, the temperature of the air into the engine must be measured and reported to the engine control unit (ECU). The ECU, which is the computer that controls all of the electronic engine components, uses this information to optimize the fuel delivery so the air-to-fuel ratio produces efficient combustion.

The customer needed a temperature sensor to install directly into the engine manifold. GE Sensing responded by designing an Air Intake Manifold Sensor that consists of an NTC thermistor with a custom designed molded connector that easily installs into the manifold. Once installed, the assembly is sold to an international motorcycle manufacturer and used as a part of one of their new model engines.

Advantages

GE Sensing's lead frame construction of the sensor requires two solder connections, as opposed to a minimum of four for similar sensors. To reduce the number of connections, the thermistor's unique design combines the wire lead from the thermistor and the terminal blade into one piece. Fewer connections equal more reliability since each wiring connection is a potential failure point.

Equipment

Temperature measurements were taken using GE Sensing's custom designed Air Intake Manifold Sensor. The sensor consists of an NTC thermistor with a specially designed connector molded in plastic to install directly into the engine manifold.



Figure 1: GE Sensing's Custom Designed Air Intake Manifold Sensors

Installation

The Air Intake Manifold Sensor is installed into the engine manifold. A bolt is threaded through the boss on the left hand side to secure it to the manifold. An o-ring provides an airtight seal to the intake manifold. See Figure 2 for installation.



Figure 2: Air Intake Manifold Sensor Installed in Engine Manifold

Specifications

Resistance: 2,795 ohms \pm 2.5% at 25°C
Materials: Nylon 6/6 plastic mold connector