

Delphi Multec[®] 3.5 Heated Tip Port Fuel Injector

The Delphi Multec[®] 3.5 Heated Tip Port Fuel Injector (Multec 3.5HT) is part of a family of proven gasoline port fuel injectors. It has an integrated heating device that enables engine cold starting with ethanol fuel and reduces cold start emissions with gasoline blends.

Because of ethanol's low Reid Vapor Pressure (RVP) and high flash point, fuel heating becomes necessary to enable the formation of an ignitable mixture at low temperatures. The Delphi Multec 3.5HT Injector features an innovative concept that increases the temperature of the ethanol fuel for cold start ignition. An electrical current supplied to two heater terminals in the injector connector is transferred to a resistor in the injector body. Heat generated by the resistor is transferred to the fuel through the injector body. The simplified design provides customers with excellent ignition reliability and high quality.

▶ Benefits

- Eliminates the need for an auxiliary gasoline cold-start fuel system on vehicles that use E100 fuel
- Enables E100 cold starting below 18°C without the need to add gasoline
- No pre-crank heating time is required unlike competitive heated rail injection systems
- Helps reduce hydrocarbon (HC) and carbon-monoxide (CO) emissions to help manufacturers meet U.S. Environmental Protection Agency cold start testing at 20°C (EPA 75)

▶ Typical Applications

The Delphi Multec 3.5 Heated Tip Port Fuel Injector is designed specifically for port fuel injection engine applications that operate on E100 (ethanol) fuel. The injector is also compatible with other ethanol- and methanol-blend fuel systems, such as:

- NAE10
- E24
- E85
- M21

▶ Availability

The Delphi Multec 3.5 Heated Tip Port Fuel Injector is scheduled to begin production in mid-2012. Engineering samples are available to automotive manufacturer customers. Contact Delphi for further information.



Delphi Multec[®] 3.5 Heated Tip Port Fuel Injector eliminates the need for an auxiliary gasoline cold-start fuel system for vehicles that operate on E100 fuel.



Heater and fuel control solenoids shown in the Delphi Multec 3.5 Heated Tip Port Fuel Injector.

▶ **Performance Advantages**

The Delphi Multec 3.5 Heated Tip Port Fuel Injector is based on the Delphi Multec® 3.5 Extended Tip Injector, which has been in production since 2006 and offers proven quality and reliability. The Delphi Multec 3.5 Injector family provides excellent linear range, spray performance, and tip leakage. The injectors are also robust to fuel plugging and can meet a wide range of individual customer design specifications including spray geometry, electrical connectors and a variety of packaging requirements.

Additionally, the simplified design of the Delphi Multec 3.5HT Injector and Delphi's network of low cost, close-to-the-customer manufacturing sites provide customers with excellent quality and high value.

▶ **The Delphi Advantage**

Delphi has produced hundreds of millions of gasoline fuel injectors over the years for customers around the world. That vast experience has led to product and manufacturing process improvements which have helped eliminate contamination-related failures and provided other quality and cost advantages. Delphi's in-depth knowledge of automotive systems and the combustion process help optimize injector performance.

As a global leader in engine management systems technology, Delphi can help manufacturers meet emissions requirements, improve fuel economy and enhance performance. Delphi is a source for high value solutions and our systems approach encourages collaboration. And, Delphi has a thorough understanding of automotive markets around the world and a global network of resources.