

## Application Note

# Low Temperature Passive Probes, LTP Series Fuel System

### Background

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Multiple sensors are used in many heavy duty transportation automotive systems to monitor temperature, gases, voltages/ currents, vacuum and torque, to name a few. Twenty years ago, the typical heavy duty application used approximately five sensors. Today, typically 50 sensors may be used to control many vehicle systems

### Solution

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Honeywell's Low Temperature Passive Probes, LTP Series, are a modular range of temperature sensors designed for potential use in transportation applications. The LTP Series feature a durable, closed-tip design that maximizes reliability in harsh applications. The sensor's thermistor sensing element effectively senses gases, liquids or solids because of its enhanced sensitivity, accuracy and reliability. Easy-to-install threaded mounting provides reliable operation in harsh environments. Numerous options—from mechanical and electrical interface—simplify installation, allow customers to meet their specific application needs, and facilitate backwards-compatibility with most existing applications.

### TRANSPORTATION

**Description:** A fuel temperature sensor senses the temperature of the fuel to determine how much fuel must be sent in so that the emissions and fuel economy are kept in control. Hot fuel is less dense than colder fuel which leads to differences in the amount of fuel sent in if the rate of fuel injection is kept the same. Leaner mixtures lead to loss in power and higher cylinder temperatures which lead to increase in emissions. The sensors usually operate in a closed feedback loop and thus regulate the fuel injection according to the emissions requirement. Accordingly they help to maintain a consistent air-fuel mixture.

**Sensor:** Fuel Temperature (FT) sensor

**Location:** The FT sensor is typically located near the high pressure pump on the inlet line.

**Function:** The FT sensor is designed to measure the temperature of the fuel and relay this information to the engine control unit (ECU). Regarding hot start situations: After stopping a hot engine, the combination of high engine bay temperatures and stationary fuel in the fuel system may cause fuel vaporization.

If an attempt to restart the engine is made before the fuel has cooled, the engine may not start and run satisfactorily until the fuel system has had time to circulate fresh fuel to the fuel rail. As the vaporized fuel is less dense, fuel injector pulse widths must be increased during hot restarts. The ECU applies corrections to the injector pulse widths based on the fuel temperature provided by the FT sensor. The FT sensor enables the engine to run at maximum efficiency based on temperature. An optimized combustion process reduces pollutants that are emitted via the exhaust system.


### Value to Customers

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- Helps maximize fuel efficiency
- Helps maximize engine performance
- Helps reduce operation costs

# Application Note

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LTP Series	Features
	<ul style="list-style-type: none"><li>• Temperature range: -40 °C to 150 °C [-40 °F to 302 °F]</li><li>• Response time [T63.2% of 25 °C to 85 °C step]: stirred silicon oil &lt;15 s; stirred water &lt;15 s; air flow 10 m/s &lt;20 s</li><li>• Accuracy:<ul style="list-style-type: none"><li>- -40 °C to 25 °C [-40 °F to 77 °F]: ±2.5 °C</li><li>- 25 °C to 100 °C [77 °F to 212 °F]: ±0.8 °C</li><li>- 100 °C to 125 °C [212 °F to 257 °F]: ±2.0 °C</li><li>- 125 °C to 150 °C [257 °F to 302 °F]: ±3.5 °C</li></ul></li><li>• Electrical interface: Deutsch 2 position (AMP Minitimer, Bosch Kompakt, Delphi Metri-Pack, AMP seal 16, and AMP Superseal connector style variants available upon request)</li><li>• Probe length options: 20 mm to 50 mm</li><li>• Mechanical fastening options: M10 to M18, 3/4 UNF, and G 1/4 (other threads available on request)</li><li>• Retainer ring with hex: provides complete location for socket wrench in axial and radial directions, enabling the operator to first locate the sensor inside the socket freely and more easily install the sensor</li><li>• Insulation resistance between I/O pin and the sensor's housing: &gt;10 MOhm at 250 Vdc, 25 °C [77 °F]</li><li>• Ingress protection: IP67</li><li>• Vibration: 30 g sine wave, 10 Hz to 2000 Hz</li><li>• Mechanical shock: 50 g</li><li>• Service pressure: 10 bar</li><li>• Burst pressure: 40 bar</li><li>• Wire harness (with or without a connector) or other sensing elements (PTC or RTD) available upon request</li></ul>

### Find out more

To learn more about Honeywell's sensing and control products, call **1-800-537-6945**, visit **sensing.honeywell.com**, or e-mail inquiries to **info.sc@honeywell.com**

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While we provide application assistance personally, through our literature and the Honeywell web site, it is up to the customer to determine the suitability of the product in the application.

Specifications may change without notice. The information we supply is believed to be accurate and reliable as of this printing. However, we assume no responsibility for its use.

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009085-1-EN IL50  
July 2015  
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