

Application Note

Low Temperature Passive Probes, LTP Series Automatic Transmission System

Background

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

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: An automatic transmission (also called automatic gearbox) is a type of motor vehicle transmission that can automatically change gear ratios as the vehicle moves, freeing the driver from having to shift gears manually. The motion of the crankshaft is transferred to a differential unit by the automatic transmission fluid (ATF) which is a high grade petroleum product containing several chemical additives. The ATF flows through the passages and valves to operate clutches and brakes that control gears and other moving parts. The ATF is also used to cool, clean and lubricate moving parts, and helps prevent corrosion of the parts.

Sensor: Transmission Fluid Temperature (TFT) sensor

Location: The TFT sensor is typically located in the valve body or oil pan of the transmission or transaxle.

Function: The Transmission Control Module (TCM) uses the signal from TFT sensor, along with other sensors, to control transmission operations. When the temperature is cold, the TCM will delay Torque Converter Clutch (TCC) operation until the fluid reaches a certain temperature. The TCM will engage the TCC mechanically, connecting the input shaft to the engine in an attempt to cool the fluid if it gets too hot. For example, without adequate ATF cooling, a fire engine that is used to fight outdoor and wildland fires will likely exhibit a very high ATF operating temperature.

ATF has a life of approximately 100,000 miles at 79.4 °C [175 °F]. ATF manufacturers suggest that for every 20 °F increase in operating temperature above 175 °F, the life of the fluid is cut in half. Hence, at 195 °F fluid life will be approximately 50,000 miles.

At temperatures above 240 °F, fluid life is zero. At high temperatures, ATF oxidizes, turning from red to brown and exhibiting a burnt smell, which reduces the fluid's lubricating quality and produces a varnish on internal parts. At temperatures above 250 °F, rubber seals can harden (leading to pressure loss and leaks), the transmission can slip, and clutches can fail, resulting in costly repairs.

The Transmission Fluid Temperature (TFT) sensor helps the Transmission Control Module operate within the optimum range.

Value to Customers

- Contributes to cooling the ATF fluid when it gets too hot
- Helps maximize ATF life
- Helps reduce operation costs
- Helps extend system life

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LTP Series	Features
<p>Bosch Kompact</p> 	<ul style="list-style-type: none"> • Temperature range: -40 °C to 150 °C [-40 °F to 302 °F] • Response time [T63.2% of 25 °C to 85 °C step]: stirred silicon oil <15 s; stirred water <15 s; air flow 10 m/s <20 s • Accuracy: <ul style="list-style-type: none"> - -40 °C to 25 °C [-40 °F to 77 °F]: ±2.5 °C - 25 °C to 100 °C [77 °F to 212 °F]: ±0.8 °C - 100 °C to 125 °C [212 °F to 257 °F]: ±2.0 °C - 125 °C to 150 °C [257 °F to 302 °F]: ±3.5 °C • Electrical interface: Bosch Kompact, Delphi Metri-Pack 150 Series, AMP Seal 16, AMP Minitimer, AMP Superseal, and Deutsch DT04-2P • Probe length options: 20 mm to 50 mm (other lengths available upon request) • Mechanical fastening options: M10 to M18, 3/4 UNF, and G 1/4 (other threads available on request) • 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 to freely and more easily install the sensor • Insulation resistance between I/O pin and the sensor's housing: >10 MOhm at 250 Vdc, 25 °C [77 °F] • Ingress protection: IP67 • Vibration: 30 g sine wave, 10 Hz to 2000 Hz • Mechanical shock: 50 g • Service pressure: 10 bar • Burst pressure: 40 bar • Wire harness (with or without a connector) or other sensing elements (PTC or RTD) available upon request
<p>Delphi Metri-Pack 150 Series</p> 	
<p>AMP Seal 16</p> 	
<p>AMP Minitimer</p> 	
<p>AMP Superseal</p> 	
<p>Deutsch DT04-2P</p> 	

Find out more

To learn more about Honeywell Sensing and Productivity Solutions' products, call **+1-815-235-6847** or **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.

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