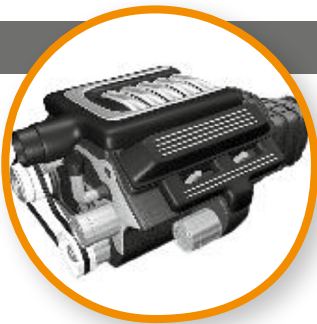


TE Connectivity's  
**SENSOR  
TECHNOLOGIES**  
for the Automotive Industry

# SENSOR TECHNOLOGIES FOR THE AUTOMOTIVE INDUSTRY

TE Connectivity (TE) is one of the largest sensor companies in the world, with innovative sensor solutions that help customers transform concepts into smart, connected creations. To transport passengers safely and efficiently, vehicles need data. Today's cars can sense and respond to changing conditions, inside and out.

TE sensors help provide the data for control, adaptation and response of vehicle functions that increase safety, comfort, and efficiency. Our technology is an integral part of many modern nervous systems in vehicles.



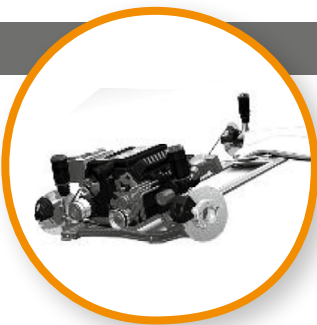
## ENGINE/E-MOTOR

Our engine and e-motor sensors are used in vehicle applications such as travel sensor for turbo charger actuator, pneumatic (EGR) Cylinder, CAM and Crank Shaft Speed sensors and resolvers for e-motor commutation.



## EXHAUST

TE provides a range of sensors for exhaust gas applications, such as urea quality, level and temperature, urea pump pressure and exhaust gas temperature (EGTS). These sensors help the OEM to comply with the latest emission regulations and significant performance improvement of modern aftertreatment systems.



## CHASSIS

We provide a range of chassis solutions for roof and convertible switches, actuator and cylinder position, seat position and weight classification. Our humidity and temperature technologies are used in Heating, Ventilation and Air Conditioning (HVAC) systems to prevent wind screen fogging and for energy management.



TE Connectivity is committed to making cars safer, greener and more connected. We support this commitment by integrating innovative sensors in demanding application areas such as automated transmissions, engines, clutch, brake and other mission critical areas.

Our sensors are designed and manufactured to exacting specifications, often on a custom basis. Together with our customers, we are working to solve today's biggest application challenges in new and creative ways.



## BRAKE

Our brake sensors are used in vehicle applications such as travel sensor for brake master cylinder position (optional redundancy), travel sensor for rear axle steering, rotary sensor for brake pedal position detection (optional redundancy); contactless brake light switch and wheel speed sensor. We also provide pressure sensors such as the vacuum brake booster sensor and brake line pressure for ABS/ESC modules.



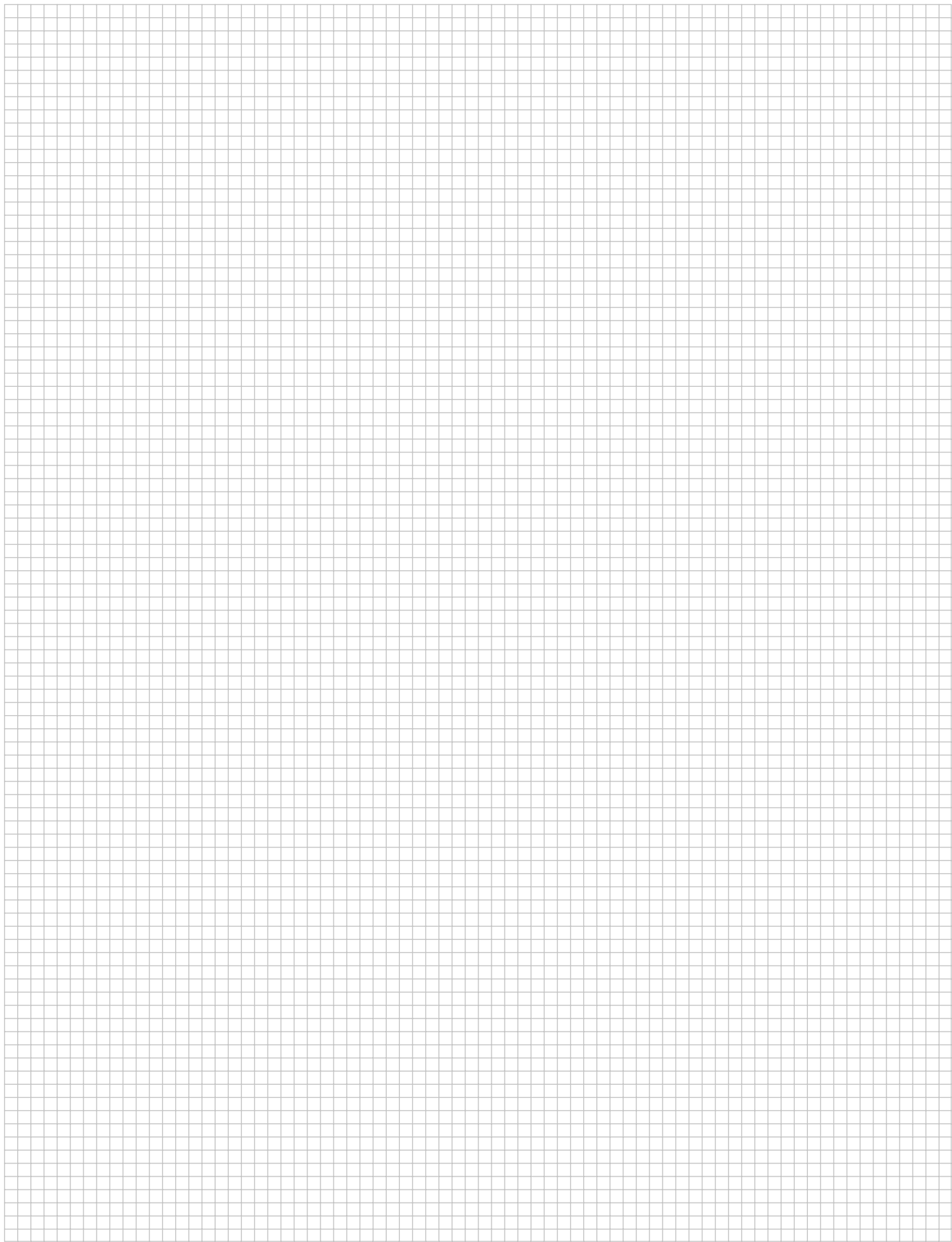
## TRANSMISSION

TE's transmission sensors are used in vehicle applications such as all gear / neutral detection for manual transmission (MT) to support start and stop function, drive mode (travel or rotary) for automatic (AT), continuously variable (CVT), or dual clutch (DCT) transmissions. We also provide pressure and temperature solutions.



## CLUTCH

The clutch sensors are used in vehicle applications such as Permanent-magnetic Linear Contactless Displacement (PLCD) sensors for concentric slave cylinder and clutch slave cylinder, rotary sensors for clutch pedal position detection; contactless switch for clutch master cylinder and travel sensor for clutch master cylinder and Dual Clutch Transmission (DCT).





## Brake Sensors

### INTRODUCTION

Our brake sensors are used in vehicle applications such as brake master cylinder position detection, travel sensor for rear axle steering to support advanced ESP, rotary sensor for brake pedal position detection, hall brake light switch and wheel speed sensors.

Many of our sensors offer optional redundant output signals for increased safety.

#### Position

- Brake Light
- Regenerative Brake
- Pedal Simulator
- Angular/Linear Actuator

#### Pressure

- Vacuum Brake Booster
- Electronic Stability Control Brake Pressure

#### Speed

- Wheel Speed (ABS/ESC)
- Brake Pad \*

\* in development



### Brake Vacuum Sensor



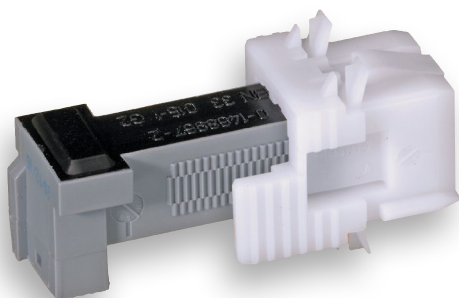
<b>Industry</b>	Automotive
<b>Application</b>	Start-Stop System
<b>Functions</b>	Measuring pressure of brake booster
<b>Technology</b>	MEMS
<b>Features</b>	<ul style="list-style-type: none"> <li>• Operating Voltage: 5V (4.5 - 5.5 V)</li> <li>• Operating Temperature: -40 to +150°C</li> <li>• Operating Pressure Range: <math>\pm 1.05</math> bar (programmable for each customer)</li> <li>• Analog or Digital (SENT) output</li> <li>• Burst Pressure: 5 Bar</li> <li>• Accuracy over lifetime: 1.5%</li> <li>• Compliance with ASIL "C"</li> </ul>

### Brake Cylinder Position Sensor



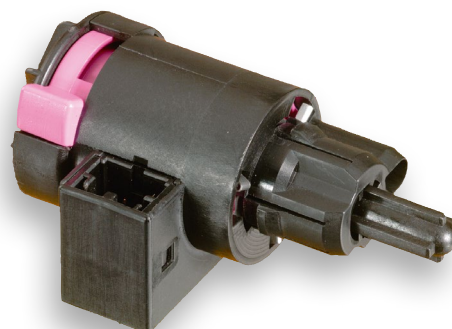
<b>Industry</b>	Automotive
<b>Application</b>	Regenerative Braking
<b>Functions</b>	Measuring piston position of Brake Master Cylinder
<b>Technology</b>	Active PLCD (moving magnet)
<b>Features</b>	<ul style="list-style-type: none"> <li>• Non-contact travel measurement through cylinder wall</li> <li>• Optional redundancy</li> </ul>

### Brake Light Sensor



<b>Industry</b>	Automotive
<b>Application</b>	Pedal Box
<b>Functions</b>	Measuring Brake Pedal Position
<b>Technology</b>	Hall Switch (magnet integrated in sensor)
<b>Features</b>	<ul style="list-style-type: none"> <li>• Easy adjustment to brake pedal</li> <li>• High switching point accuracy</li> <li>• No wear and tear</li> <li>• Non-contacting</li> <li>• Two- and three-wire interface available</li> <li>• Dual output for added safety</li> </ul>

### Brake Light Sensor (self-adjusting features)



<b>Industry</b>	Automotive
<b>Application</b>	Pedal Box
<b>Functions</b>	Measuring Brake Pedal Position
<b>Technology</b>	Hall Switch (magnet integrated in sensor)
<b>Features</b>	<ul style="list-style-type: none"> <li>• Easy adjustment to brake pedal (self-adjusting features)</li> <li>• High switching point accuracy</li> <li>• Redundancy</li> </ul>

#### Wheel Speed Sensor - Option 1



<b>Industry</b>	Automotive Industrial & Commercial Transportation
<b>Application</b>	Anti-lock brake system
<b>Functions</b>	Wheel speed detection
<b>Technology</b>	Hall (magnet integrated in sensor)
<b>Features</b>	<ul style="list-style-type: none"> <li>• Long life time and high reliability</li> <li>• Compact size and comparative price</li> <li>• Flexible design depending on customer's requirements</li> <li>• Non-contact hall sensor</li> <li>• Rapid response time</li> <li>• Tone wheel detection</li> </ul>

#### Wheel Speed Sensor - Option 2



<b>Industry</b>	Automotive Industrial & Commercial Transportation
<b>Application</b>	Anti-lock brake system
<b>Functions</b>	Wheel speed detection
<b>Technology</b>	Hall (magnet integrated in sensor)
<b>Features</b>	<ul style="list-style-type: none"> <li>• Long life time and high reliability</li> <li>• Compact size and comparative price</li> <li>• Flexible design depending on customer's requirements</li> <li>• Non-contact hall sensor</li> <li>• Rapid response time</li> <li>• Tone wheel detection</li> </ul>

#### Brake Pedal Sensor



<b>Industry</b>	Automotive
<b>Application</b>	Regenerative Braking
<b>Functions</b>	Measuring position of brake pedal
<b>Technology</b>	Active PLCD (moving magnet)
<b>Features</b>	<ul style="list-style-type: none"> <li>• Non-contact travel measurement</li> <li>• Optional redundancy</li> <li>• 5V supply (optional 12V)</li> <li>• Analog or PWM output</li> </ul>

#### Hall Sensor T40MC2



<b>Industry</b>	Automotive
<b>Application</b>	Brake, Engine, Transmission, Clutch, Chassis
<b>Functions</b>	Measuring travel position
<b>Technology</b>	Hall (moving magnet)
<b>Features</b>	<ul style="list-style-type: none"> <li>• Non-contact measurement of magnet target</li> <li>– up to 360° angular measurement</li> <li>– up to 40mm linear measurement</li> <li>• Highly insensitive to vibration</li> <li>• Temperature range -40°C ... +150°C</li> <li>• Analog or PWM interface</li> <li>• Small geometry</li> <li>• Optional redundancy</li> <li>• Supply 5V (optional 12V)</li> <li>• 4-way MCON connector interface</li> <li>• Optional alternative output protocol (e.g. SENT)</li> </ul>

