

# POWERTRAIN AND eMOTOR SENSOR PORTFOLIO

## TAILORED SOLUTIONS TO DRIVE THE FUTURE OF VEHICLE PERFORMANCE AND RELIABILITY.

At TE Connectivity (TE), our Powertrain and eMotor sensor portfolio reflects over a decade of precise engineering, built to address the real-world demands of modern powertrains. Our sensors offer dependable, high-performance solutions backed by our industry-leading expertise and dedicated global support network. We go beyond providing components, forming trusted partnerships that anticipate and resolve the unique challenges of powertrain development—empowering our customers to accelerate innovation with confidence.



### Optimized System Performance

Utilizing industry-leading sensing technology, TE provides sensor development platforms with advanced failure detection and sensor redundancy features tailored to meet customer specifications and enable unrestricted system interaction.



### Harsh Environment and Electromagnetic Noise

Adapting to the automotive industry's shift towards electrification and its electromagnetic challenges, TE is committed to engineering resilient design solutions. Our sensors, with a legacy of reliability in harsh automotive settings, utilize various technologies to manage EMI, providing consistent and dependable functionality.



### Production and Quality

TE champions quality through its automated assembly processes in clean environments and a continuous improvement program that extends throughout the product lifecycle, aiming to achieve a ZERO PPM experience for customers and enhance overall product quality.



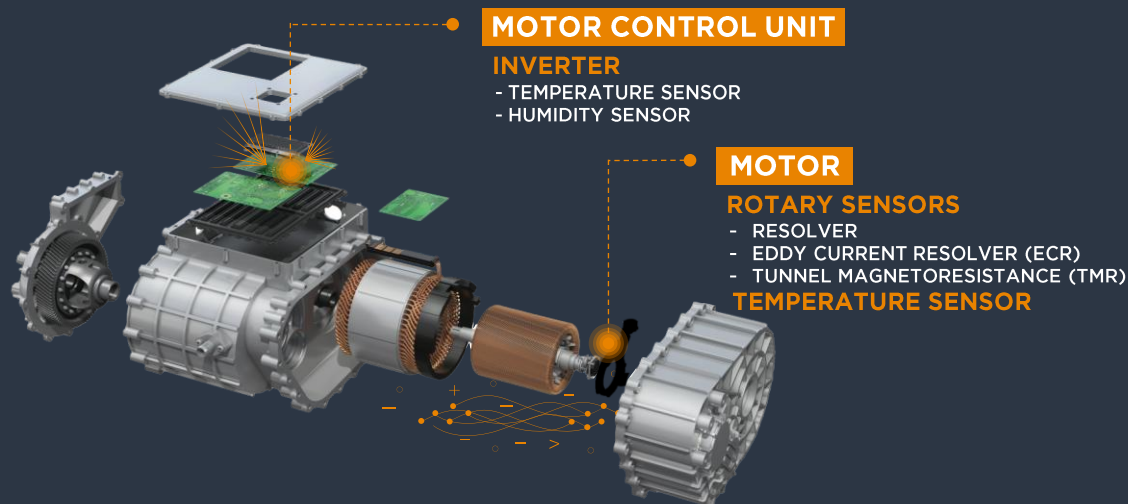
### Worldwide Excellence in Service and Design

With a strong global footprint, TE harnesses core competencies from around the world to deliver industry leading technical skills and localized expert support.




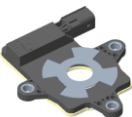

### Safety Through Rigorous Standards




TE's robust redundancy solutions, conforming to Functional Safety per ISO26262 up to ASIL D functional safety requirements, integrate exhaustive Failure Mode and Effects Analysis (FMEA) alongside total test-to-failure strategies, providing superior design integrity and reliability to meet critical safety targets.



## FEATURED POWERTRAIN AND EMOTOR SENSORS

Explore TE's list of featured sensors designed to meet the specific challenges of powertrain and eMotor applications. These sensors are engineered for efficiency and reliability, helping to enhance the performance and sustainability of modern powertrain systems. Using high-performance materials and innovative designs, TE provides engineers with the components needed to tackle the demands of today's powertrain and eMotor technologies.

Sensor	Application	Key Product Features	Benefits
<b>Resolver</b> Resolver with Integrated Temperature Sensor (Optional) 	eMotors	<ul style="list-style-type: none"> <li>Reliable and field proven technology</li> <li>Temperature range:-40°C up to +150°C</li> <li>High Accuracy:±/-1° electrical</li> <li>ASIL D on system level</li> <li>Oil or glycol compatible</li> <li>Specialized design support and manufacturing over the globe</li> <li>Combined design with temperature sensor possible</li> <li>Robust against external fields</li> </ul>	<ul style="list-style-type: none"> <li>Adopting fault-tolerant technology, the proprietary winding design resists eccentricity and external magnetic fields.</li> <li>TE enhances compatibility through comprehensive vertical integration (connectors, cable assemblies, and additional sensors).</li> <li>Optional NTC Temperature Sensor</li> </ul>
<b>Eddy Current Resolver (ECR)</b> 	eMotors	<ul style="list-style-type: none"> <li>Small size &amp; Light weight</li> <li>Temperature range:-40°C up to +150°C</li> <li>High Accuracy:±/-1° electrical</li> <li>Standard ASIL C, alternative ASIL D possible</li> <li>Application in oil possible</li> <li>Flexible design options, different variants for different shaft sizes and pole pair numbers possible</li> <li>Standard analog output, digital also possible</li> <li>Customized pigtail cable versions or integrated connector interface</li> </ul>	<ul style="list-style-type: none"> <li>High-precision angle measurement</li> <li>Strong immunity to electromagnetic interference</li> <li>Supports ASIL C/D compliance</li> <li>Low system cost</li> </ul>
<b>Tunnel Magnetoresistance (TMR)</b> <i>*In development</i> 	eMotors	<ul style="list-style-type: none"> <li>Miniature size &amp; light weight</li> <li>Temperature range: -40°C up to +150°C</li> <li>High Accuracy:±/-0.25° mechanical</li> <li>Standard ASIL C, alternative ASIL D possible</li> <li>Application in oil possible</li> <li>Vertical integrated solution</li> </ul>	<ul style="list-style-type: none"> <li>Compact and lightweight, ideal for space-constrained installations</li> <li>High precision</li> <li>ASIL C/D compliant</li> <li>Low system cost</li> </ul>

Sensor	Application	Key Product Features	Benefits
Temperature Sensor 	eMotors	<ul style="list-style-type: none"> <li>• Temperature range:- 40°C to 200°C</li> <li>• 1% Accuracy at 100°C</li> <li>• Fast Response Time</li> <li>• Miniaturized component design</li> <li>• Automotive qualified: AEC-Q200 Rev E</li> <li>• Dissipation constant 1.3mW/C</li> <li>• ATF Oil proof</li> <li>• High Dielectric strength</li> </ul>	<ul style="list-style-type: none"> <li>• Heat-shrink fusion process eliminates oil contamination.</li> <li>• Excellent oil sealing ensures stable performance of the temperature probe in motor environments, preventing motor damage caused by probe failure.</li> <li>• The temperature probe delivers stable and consistent performance.</li> <li>• Core components are available in NTC or Pt options.</li> <li>• Small outer diameter for easier insertion and assembly</li> </ul>
Temperature sensor 	Inverter	<ul style="list-style-type: none"> <li>• Temperature range (-55°C to +160°C )</li> <li>• Automotive qualified accoring to AEC-Q-101</li> <li>• Small SMD package SOT23 for short step response</li> <li>• Comply with former DIN43760 standard Class B</li> <li>• Good linearity between resistance and temperature</li> <li>• Package MLS1 certified (Moisture • Sensitivity Level in JEDEC J-STD-020)</li> </ul>	<ul style="list-style-type: none"> <li>• The product meets stringent automotive application standards, including exposure to hot oil.</li> <li>• Compact size and low cost</li> <li>• Excellent resistance-temperature linearity</li> <li>• Fast thermal response</li> </ul>
Humidity sensor 	Inverter	<ul style="list-style-type: none"> <li>• Humidity and temperature sensor</li> <li>• HTU31D Digital version - I<sup>2</sup>C with 2 configurable addresses</li> <li>• HTU31V Analog version - 0.5V to 4.5V output</li> <li>• Wide supply voltage range - 3.0V to 5.5V</li> <li>• Factory calibrated</li> <li>• Compact 6-pin DFN surface mount package</li> <li>• Compatible with IR reflow solder processes</li> <li>• Qualified to AEC Q100 grade 1 standard</li> <li>• Excellent temperature accuracy</li> <li>• High reliability and environmental robustness</li> <li>• Low power consumption - 450 µA</li> <li>• Sleep mode - 0.2 µA max</li> </ul>	<ul style="list-style-type: none"> <li>• Precision Engineering</li> <li>• Fast Response Time</li> <li>• High Performance</li> <li>• Digital &amp; Analog Versions</li> <li>• Multiple I<sup>2</sup>C Addresses</li> <li>• Compact Footprint: 2.5x2.5x0.9mm</li> </ul>

Sensor	Application	Key Product Features	Benefits
<b>Position Through-Hole Position Sensor</b>  	Parklock Transmission Linear/ Angular Movement Disconnect Unit	<ul style="list-style-type: none"> <li>• PCBless Design</li> <li>• Contactless Position Sensor</li> <li>• Through-Hole Design</li> <li>• Robust in Harsh Environments</li> <li>• Oil tight and IP6K9 rated</li> <li>• ASIL C</li> <li>• High quality sealing, material choice and strict process control on overmolding of the IC</li> <li>• Wire harness connection simplified through external electrical connections</li> </ul>	<ul style="list-style-type: none"> <li>• Specifically designed for external mounting on transmission casings</li> <li>• A compact, cost-effective and resilient solution suited for demanding transmission and harsh environment applications</li> <li>• Tight tolerances and high reliability helps enable adherence to stringent safety regulations</li> </ul>
<b>Position Rotation Position Sensor</b>  	Shift Drum Gear Shift Transmission Angular Movement	<ul style="list-style-type: none"> <li>• PCBless Design</li> <li>• Contactless Position Sensor</li> <li>• Seembled Magnet Carrier</li> <li>• Robust in Harsh environments</li> <li>• ASIL C</li> </ul>	<ul style="list-style-type: none"> <li>• Specifically designed for external mounting on transmission casings</li> <li>• A compact, cost-effective and resilient solution suited for demanding transmission and harsh environment applications.</li> <li>• Tight tolerances and high reliability helps enable adherence to stringent safety regulations</li> </ul>
<b>Speed Transmission Speed Sensor</b>  	Measurement of the input or output speed of a transmission gear wheel	<ul style="list-style-type: none"> <li>• Designed for harsh environments</li> <li>• Hall and GMR technology</li> <li>• Different shapes available</li> <li>• Diagnostics ability due to two-wire interface</li> <li>• ASIL B</li> <li>• Current interface with direction detection</li> <li>• IP6K9K sealed connector interface</li> </ul>	<ul style="list-style-type: none"> <li>• Designed to withstand extreme vibration, shock and tough operating environments for long-term reliability</li> <li>• Available in different shapes to accommodate diverse design requirements across transmission platforms</li> <li>• High protection against contamination from dust and water provides consistent performance</li> </ul>

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## HAVE A UNIQUE CHALLENGE? WE'VE GOT YOU COVERED.

At TE, we understand the critical role of precise, high-quality sensors in automotive engineering. Our solutions, developed through advanced engineering capabilities and industry application knowledge, are tailored to meet the most demanding technical requirements. Around the world, we provide responsive service and seamless integration into your new and existing systems. If you're looking for sensors that deliver both performance and reliability, let's connect. Our team is ready to discuss how we can contribute to the success of your next project with our customized sensor solutions.

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