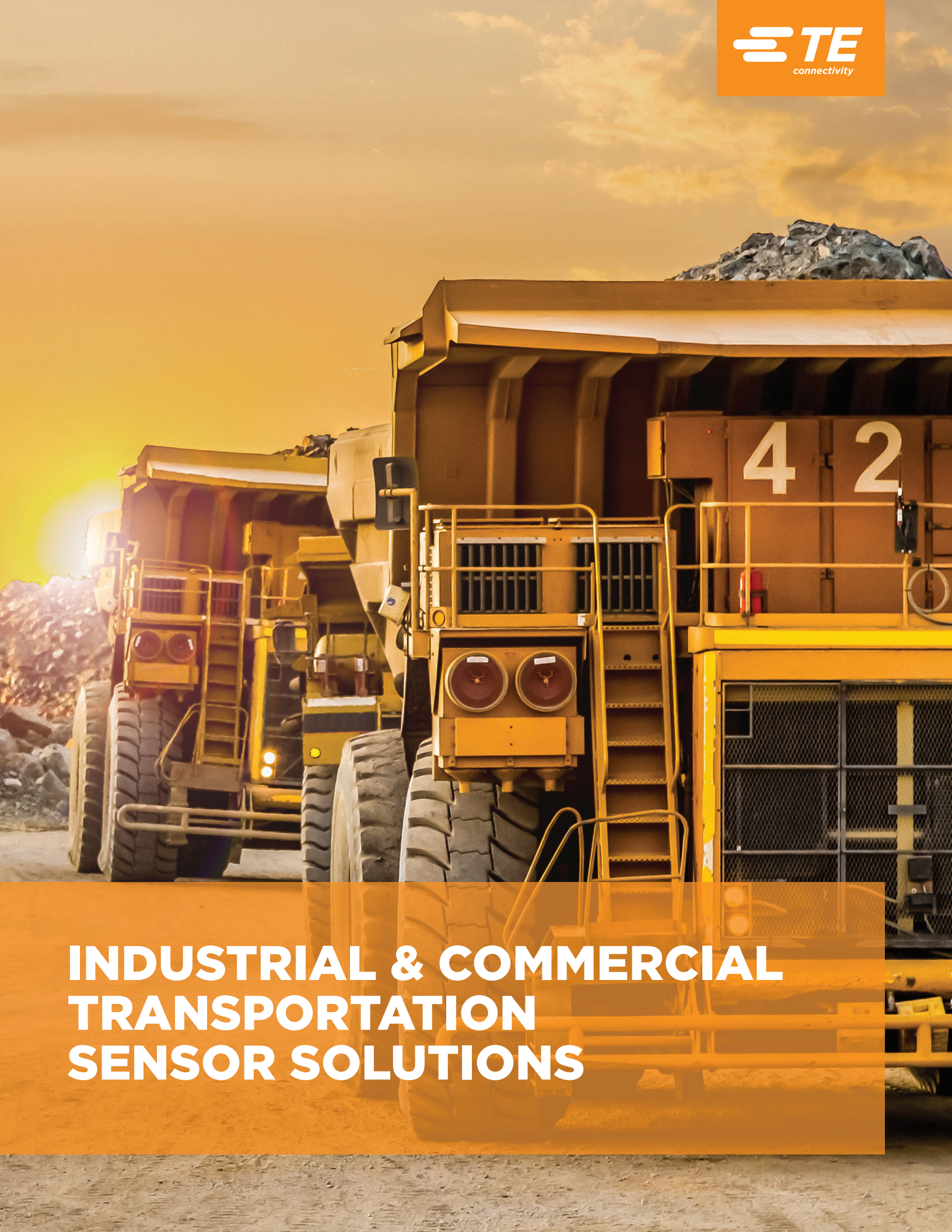


A photograph of two large yellow mining trucks at a quarry during sunset. The truck in the foreground is a Caterpillar 980G, with the number '42' visible on its side. The background shows a pile of rocks and a bright orange sky.

INDUSTRIAL & COMMERCIAL TRANSPORTATION SENSOR SOLUTIONS

SENSOR SOLUTIONS FOR INDUSTRIAL & COMMERCIAL TRANSPORTATION

TE Connectivity (TE) is a global technology leader, providing connectivity and sensor solutions essential in today's increasingly connected world. TE is one of the largest sensor companies in the world. Our sensors are vital to the next generation of data-driven technology.



When performance and reliability count, engineers rely on us to help solve tough industry challenges such as emissions reduction, power train improvement and added comfort. We're a leader in providing sensor technologies and associated software/diagnostic capabilities built on market experience and technical expertise. We work closely with customers to design and provide solutions critical for a wide range of harsh and demanding applications, including exhaust, engines, transmissions, braking, suspension and cabins.



INDUSTRIAL & COMMERCIAL TRANSPORTATION APPLICATION SOLUTIONS

TE's pressure, level, temperature, urea quality and humidity sensors are recognized and validated solutions for engine and aftertreatment system support and compliance to global on and off road emissions standards. Additionally, TE designs and manufactures a range of linear position, level, humidity, temperature, speed, and pressure sensors for chassis and transmission applications and has developed innovative combination sensors for cost effective and efficient control. 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.

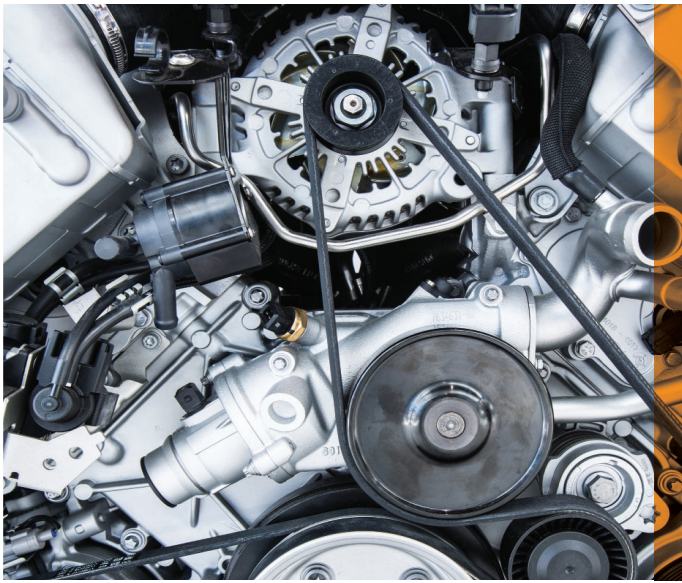


SENSOR SOLUTIONS

- CURRENT
- FLOW
- FLUID PROPERTY
- FORCE
- HUMIDITY
- LIQUID LEVEL
- PIEZO FILM
- POSITION
- PRESSURE
- TEMPERATURE
- TORQUE
- SPEED
- VIBRATION

QUALITY STATEMENTS

- AS/EN 9100
- EN 13980
- ESA 266
- IATF 16949
- IEC 61508
- ISO 14001
- ISO 26262
- ISO 9001
- Measuring Instruments Directive 2004/22/EC Annex D



ENGINE MANAGEMENT SENSOR SOLUTIONS

TE Connectivity offers a broad portfolio of sensors to help Original Equipment Manufacturers (OEM) meet the demands placed on modern engines to provide maximum performance and fuel economy while reducing emissions. TE sensors perform under the extreme temperature, vibration, shock and durability requirements of medium duty and heavy duty on road and off road vehicles.



Lubricants, Oil and Fuel Pressure

- Microfused Pressure Sensor



**Humidity Air Intake Monitoring
Engine and Emissions Management**

- Combination—Humidity, Temperature and Pressure Sensor



Engine Oil Fluid Level

- Capacitive, Inductive and Multi-Point Reed Switch Sensor Options



Coolant Fluid Level

- Solid State Switch and Level Sensors



Low Oil Level Switch

- Magnetic Reed Switch



**Engine Oil Condition
Fuel Identification and Quality**

- Fluid Property Sensor



Cam/Crank Shaft Speed

- Speed Sensor for Cam/Crank Shaft



Engine Oil Temperature

- Nickel Resistance Temperature Detector (RTD) Sensor



Turbo Speed

- Variable Reluctance and Active and Passive Eddy Current Sensors



AFTERTREATMENT SYSTEM SENSOR SOLUTIONS

TE Connectivity offers a broad portfolio of sensors that help OEMs develop environmentally friendly products that comply with global emission regulations. TE sensors effectively monitor critical components in exhaust gas aftertreatment systems to support their management and reduction of engine emissions.



Urea Temperature

- Negative Temperature Coefficient (NTC) Sensor



Urea Pressure

- Media Isolated Pressure Sensor



In-Tank Urea Quality, Level, Heating and Temperature Assembly

- Urea Level Reed Switches
- Urea Quality Sensor (Advanced Ultrasonic Sensor Technology)



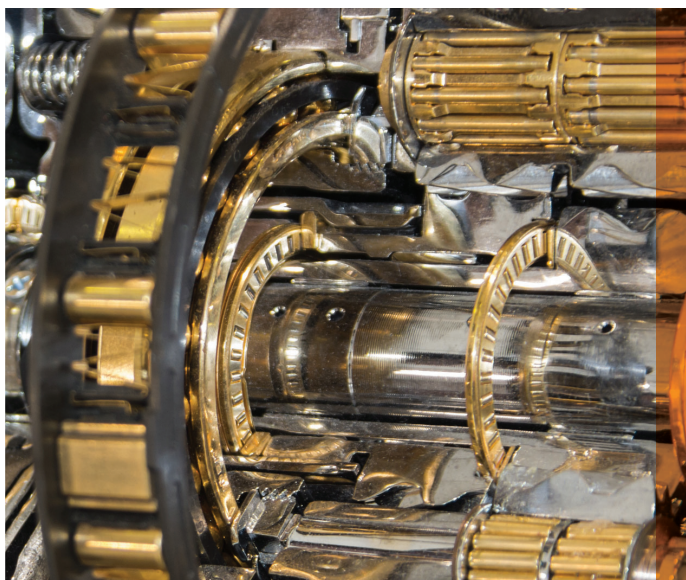
High Temperature Exhaust Gas

- PT200 RTD Sensor



EGR Valve Position

- MR and PLCD Sensor



TRANSMISSION SENSOR SOLUTIONS

TE Connectivity offers a broad portfolio of transmission sensors that enables OEMs to design and commercialize advanced transmissions that meet the modern demands of vehicle OEMs. TE sensors perform under the extreme temperature, vibration, shock and durability requirements of medium duty and heavy duty on road and off road vehicles.



Transmission Oil Pressure

- Microfused Pressure Sensor



Transmission Oil Level

- Hall Effect Sensor



Transmission Oil Level

- Microfused Pressure Sensor



Clutch Position

- Magnetic Travel Sensor



Hall Sensor T40MC2

- Hall Sensor with Moving Magnet



Dual Clutch Transmission Module

- Multiple Sensors Packaged in a Single Module (Shown: 2 Travel and 2 Pressure Sensors)



Transmission Oil Quality

- Fluid Property Sensor



Transmission Input and Output Speed

- Hall Sensor



Rotary Sensor (TRS)

- Hall 3D with Integrated Magnet



MECHATRONICS TRANSMISSION SENSOR CLUSTER

TE Connectivity has a unique sensor portfolio and capability to develop custom mechatronic sensor solutions for monitoring transmission operation and performance. TE's in-house expertise enables optimized packaged solutions that integrate terminals, connectors, harnessing and sensors to an OEMs exact needs and requirements.



Sensor Cluster

- Combination of more than one sensing element connected by wire and connector



Custom Combination

- Combination of modules, non-integrated sensors and partially clustered with wire and main connector



Sensor Bracket

- Single interface with combination of sensing elements on one bracket



Sensor Module

- Single interface with combination of sensing elements in one housing

PRODUCTS AND CONNECTIVITY - OPTIMIZED SENSOR ARCHITECTURE AND TRANSMISSION NERVE SYSTEMS

- Sensors system
- Wiring & protection
- Connectors
- Interconnections
- Customized sensor architecture layout and packaging

OPTIMIZE FUNCTIONALITY AND QUALITY

- Robust connectivity between sensor elements
- Design freedom
- Opportunity to harmonize / standardize solutions and products
- Future utilization of solutions / repeatability
- Creation of competitive advantage

SAVE TIME & EFFORT

- Turn key engineering and sourcing solution
- Expedite program launches
- Consolidated and streamlined purchasing, engineering and service

LOWER TOTAL COST

- Cost-optimized solutions
- Program size and volume based pricing



VEHICLE CONTROL AND MANAGEMENT SENSOR SOLUTIONS

TE Connectivity offers a broad portfolio of sensors that helps vehicles operate safely, increase productivity and maximize vehicle uptime.



Tilt and Ride Stability

- Single and Dual Axis Tilt Sensor
- Gyro Compensated



Hydraulic Fluid Condition

- Fluid Property Sensor



High Pressure Hydraulics and Hydrostatic Transmission Pressure

- Microfused Pressure Sensor



Fuel Level

- Magnetic Reed Switch Sensor
- Reed Switch Based Level Sensor



Short to Long Stroke Boom Position

- String Pot Sensor



Hydraulic Oil Level

- Hall Effect Sensor



Wheel Speed

- Hall Sensor with and without Integrated Magnet



Load Pin

- Multi-channel Force Sensor



Power Steering Fluid Level Single or Multi-Point

- Magnetic Reed Sensor



Steering Control Hydraulic Spool Valve

- Linear Variable Differential Transformer Position Sensor
- Magnetoresistive Linear Sensor Array



Air Brakes

- Media Isolated Pressure Sensor



Health and Condition Monitoring

- Embedded PE Vibration Sensors
- Pumps, Motors and Gear Boxes



Engine and Transmission Shafts

- Microfused Static Torque Sensor
- Dynamic Torque Sensor Inductive Technology
- Multi-axis Force and Torque Load Cells



CABIN AND OCCUPANT SAFETY SENSOR SOLUTIONS

On and off road vehicle operators encounter extreme weather and terrain, intense duty cycles and complex vehicle operation. Whether the vehicle application is short haul, long haul, construction, agriculture, forestry or mining, TE Connectivity sensors enable OEMs to build safer and more efficient vehicles that operators demand.



Anti-Fogging and HVAC

- Humidity and Dewpoint Sensor



Rotary Position

- Rotary Encoder



Seat Occupancy

- Microfused Load Cell
- Piezo Film Sensor



Cab and Seat Level

- Tilt Sensor or Switch



Seat, Handbrake and Footbrake Position Safety Interlock Switches

- Proximity, Hall and Vane Sensor



HVAC System Control

- Pressure Sensor



Fluid and Material Temperature

- NTC, Platinum, Thermocouple and Thermopile Sensors



Brake Light Switch

- Hall Sensor



ELECTRIC MOBILITY SENSOR SOLUTIONS

TE Connectivity offers a diverse portfolio of sensor technology for on and off road vehicle OEMs which enables their development of hybrid electric and fully electric vehicles, including vehicles powered by hydrogen fuel cells. Engineered for reliability under harsh conditions, TE sensors provide OEMs the capability to build breakthrough e-mobility solutions to reduce pollutants and increase vehicle efficiency.



Current Sensing

- Coreless and Integrated Current Sensors
- Shunt Sensor



Temperature Sensing

- Stator Winding Temperature Sensor



Resolver: Angular and Speed Sensor

- Accurate and Robust
- Including Cable and Optional Temperature Sensor



Tilt and Ride Stability

- Single and Dual Axis Tilt Sensor
- Gyro Compensated



Fuel Cell Humidity Management

- TRICAN Relative Humidity, Temperature and Pressure Digital Combination Sensor



Fuel Cell Hydrogen Pressure

- Hazardous Area Rated Pressure Sensor



Start and Stop City Buses

- Hydraulic Starter Pressure Sensor

ICT PRODUCT AND APPLICATION MATRIX													
	CURRENT	FLOW	FLUID PROPERTY	FORCE	HUMIDITY	LIQUID LEVEL	PIEZO FILM	POSITION	PRESSURE	TEMPERATURE	TORQUE	SPEED	VIBRATION
ENGINE MANAGEMENT		●	●		●	●		●	●	●		●	
AFTERTREATMENT SYSTEM			●		●	●		●	●	●			
TRANSMISSION			●			●		●	●	●		●	
VEHICLE CONTROL AND MANAGEMENT			●	●		●		●	●	●	●	●	●
CABIN AND OCCUPANT SAFETY				●	●		●	●	●	●			
ELECTRIC MOBILITY	●							●	●	●		●	
FUEL CELL					●				●	●			

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SS-TS-ICT110 03/2019

TE CONNECTIVITY

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