

BOURNS®

AUTOMOTIVE PRODUCT PROFILE



Automotive Sensors
Commercial Vehicle Sensors
Circuit Protection Solutions

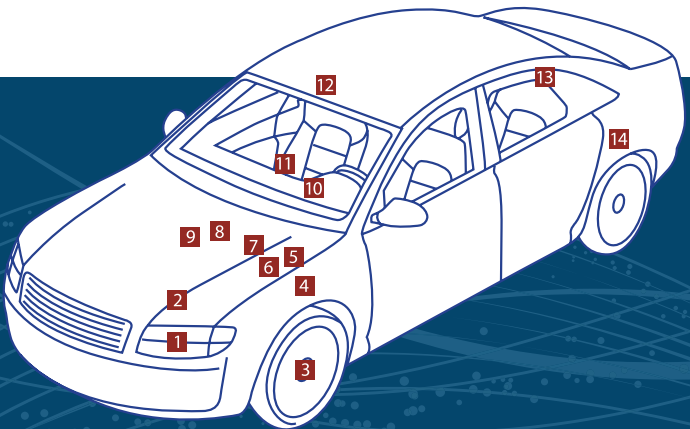
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Custom Automotive Sensors

The Bourns Automotive Division has played a leading role in the design, development and manufacture of potentiometer sensors for over 75 years. At our engineering centers in Riverside/ California, Taufkirchen/Germany, Veszprém/Hungary and Auburn Hills/Michigan we develop and design a range of customized automotive position, speed and torque sensors. These products are manufactured in Ajka/Hungary, Chihuahua & Tijuana/Mexico and Xiamen/China.

Bourns, Inc. is a privately held company with headquarters in Riverside, California. Currently, there are about 9,200 employees located in 14 different Bourns-owned design and manufacturing locations worldwide.

Our research and development work combined with close collaboration with customers helps to ensure that our products meet the highest standards set for the automotive industry. Using state-of-the-art development software and world-class production methods, Bourns can provide innovative and cost-effective solutions for your applications.



Our phenolic paper, high aluminum oxide ceramics, thermosetting plastics and specially developed Bourns® resistor inks are designed to withstand the harshest operating conditions within rated limits, with many of our sensors used in rigorous on and off highway applications. Our non-contacting sensors are developed with a wide range of magneto resistance-based angular sensor solutions supplemented by competitive Hall Effect and 2 Axis Hall Effect technology. Bourns can assist in the selection of the most appropriate technology for your specific applications.

Bourns TS16949 certified quality system and the Bourns Production System (BPS) help ensure uncompromised quality and maximum reliability. Lean production methods are also used during the design and manufacturing phases of a project. Control can be adequately exercised because Bourns offers its own in-house design, tool making, screen-printing, cermet firing and injection molding capabilities, in addition to the development of our own proprietary resistance inks.

The Bourns Automotive Division operates worldwide with its own Automotive sales team to ensure experienced support is always available at the customer's location. Further specialized technical support is offered by each product line to assist with the design process.

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|----------------------------------|-------------------------------------|
| 1 Headlight Range Sensor | 8 Transmission Speed Sensor |
| 2 Exhaust Gas Recirculation | 9 Throttle Position Sensor |
| 2 Diesel Injection Sensor | 9 Pedal Angle Sensor |
| 3 ABS Wheel Speed Sensor | 10 Dashboard Dimming |
| 4 Accelerator Pedal Sensor | 11 Air Flap Position Sensor |
| 5 Motor Position Sensor for EPAS | 12 Sunroof Control |
| 6 Steering Angle Sensor | 13 Chassis Level Sensor |
| 6 Torque Sensor | 14 Fuel Card for Fuel Level Sensing |
| 7 Brake Pedal Position Sensor | |

Custom Automotive Sensors

Types Available:

- Powertrain speed & position
- Wheel speed
- Chassis level
- Fuel level
- Brake wear
- Pedal position
- Steering torque & angle
- Throttle position
- Motor position & phase current sensors

Features:

- Contacting: resistive
- Non-contacting: VR, hall effect, xMR, inductive
- Interfaces: analog, PWM, SENT, SPI, CAN, PS15
- Extensive simulation tools
- Global engineering, testing, manufacturing, and sales support
- All sites are IATF 16949 and ISO 26262 compliant
- Innovative & cost-effective solutions



Applications

- ABS wheel speed
- Accelerator pedal
- Electric Power Steering
- Brake pedal module
- Brake wear
- Chassis Level
- Electric park brake
- Fuel tank level
- Steer by wire
- Throttle position
- Transmission position
- Transmission speed
- Transfer case position
- Motor position
- Disconnect unit position

Vehicle Dynamics Sensors

Part #	Product	Contacting	Non-Contacting	N.C. Technology	Rotary	Linear
Steering						
6002	Absolute Steering Angle Sensor		•	AMR	•	
R---	Incremental Steering Angle Sensor		•	AMR		
R---	Non-Contacting Torque Sensor		•	AMR	•	
R---	Non-contacting Torque Sensor with Angle Index-Feature (with clockspring)		•	AMR/HE	•	
R---	Clockspringfree Non-Contacting Torque Sensor		•	HE	•	
R---	Clockspringfree Non-Contacting Torque and Index Sensor		•	HE/HE	•	
	Clockspringfree Non-Contacting Torque and Angle Sensor		•	HE/AMR	•	
R---	BLDC Motor Position Sensor		•	AMR	•	
Chassis						
R---	Non-Contacting Chassis Level Sensor		•	HE	•	
Braking						
R---	Brake Pedal Sensor		•	HE	•	
R---	Passive ABS Wheel Speed Sensors		•	VR	•	
R---	Active ABS Wheel Speed Sensors		•	HE/AMR	•	

Engine & Powertrain Sensors

Part #	Product	Contacting	Non-Contacting	N.C. Technology	Rotary	Linear
R---	Exhaust Gas Recirculation	•			•	
R---	Exhaust Gas Recirculation		•	HE	•	
R041	Manifold Intake Sensor		•	HE		
2010	ETC Pedal Sensor	•				•
R078	Non-Contacting ETC Pedal Sensor		•	HE	•	
1099	Diesel Injection Pump Sensor	•				•
R---	Non-Contacting PRNDL Sensor		•	HE	•	
R---	Neutral-Reverse Gear Position Sensor		•	HE		•
R---	Gear Fork Lever Position Sensor (1D & 2D)		•	HE		•
R---	Non-Contact Linear DCT Sensor (to 25 mm)		•	HE		•
R112	Small Engine TPS Sensor (10 - 130 HP)	•			•	
R153	Motorbike Gear-by-Wire Sensor	•			•	
R---	Fuel Level Sensor	•			•	
R---	Transmission Speed Sensors		•	VR/HE/Ind.	•	

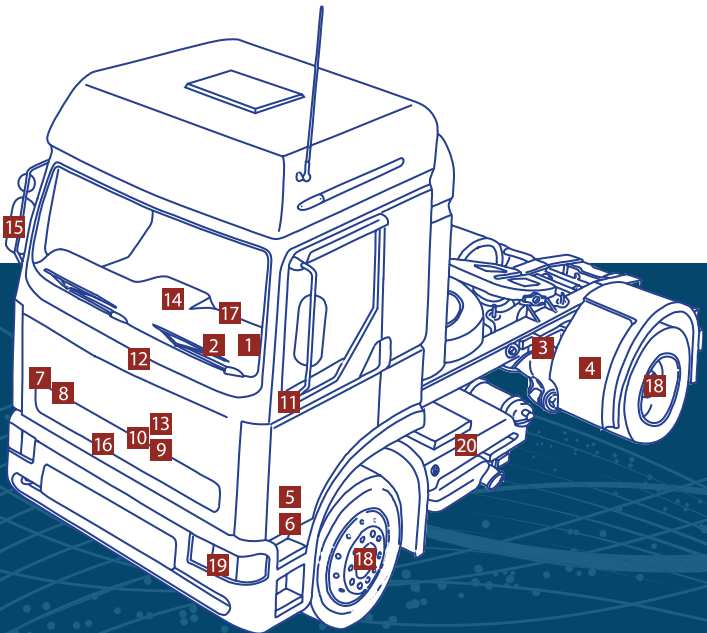
Comfort Sensors

Part #	Product	Contacting	Non-Contacting	N.C. Technology	Rotary	Linear
R205	Hollow Shaft Encoder for Powered Closure Systems - Tailgate and Side Door Applications		•	HE	•	
0478	HVAC Air Flap Sensor	•			•	
3713	HVAC Temperature Control	•			•	
3716X	Steering Reach and Rake Position Sensor	•				•
0479	External Mirror Position Sensor	•			•	
1017	External Mirror Position with Memory	•			•	
0362	4 Position Sensor - Door/Sunroof Control	•			•	
3048	Linear Motion Seat Position Sensor	•				•
1012	Linear Position Sensor - Headlamp Leveling	•				•
1015	Linear Position Sensor - Headlamp Leveling	•				•

Custom Commercial Vehicle Sensors

Active steering, electronically controlled suspension, anti-lock disc braking and exhaust gas recirculation are some examples of the increased presence of electronics in commercial vehicles. You probably know OEMs which supply these modules, but did you know that Bourns supplies the heart?

Bourns has provided custom position sensing solutions for nearly 20 years, beginning with the delivery of our custom linear brake wear sensor for commercial vehicle applications. This sensor operates each time the brake pedal is depressed to determine disc pad wear; the sensor sends a signal to the brake ECU, which evenly distributes brake application to ensure even wear takes place. For fleet users this increases the interval between pad changes and enhances the safety of the vehicle by identifying the level of pad wear.



Bourns was one of the first companies to supply high temperature contacting EGR sensors and we are currently developing high temperature, non-contacting solutions, for EGR and turbo applications.

As advancements in the reliability of commercial vehicles increase, Bourns invests in a continuous process of technical innovation. As existing technologies mature, it is fundamental to maintain our position as a dependable sensor supplier. As an example of our commitment to the progression of commercial vehicle design, we offer four different types of non-contacting sensors. We are focused on finding the most suitable technology for our customers' specific application requirements. Our non-contacting sensors are intended for applications with dither profiles extending above 200 million cycles and a duration measured in excess of 50 million full strokes. Solutions employing these technologies include the R117 2 Axis HE chassis level sensor, the J1843 R078 rotary sensor and the SAS6000 AMR based active steering sensor. Bourns automotive portfolio also includes sensors for wheel and transmission speed sensing and one of the few market proven non-contacting torque sensors.

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|------------------------------------|-------------------------------------|
| 1 Steering Angle Sensor | 10 Throttle Position Sensor |
| 2 Differential Torque Sensor | 11 Pedal Position Sensor |
| 2 Non-Contacting Torque Sensor | 12 Gear Position Sensor |
| 3 Chassis Level Sensor | 13 Diesel Injection Pump Sensor |
| 4 Brake Wear Sensor | 14 HVAC Air Flap Sensor |
| 5 Master Cylinder Brake Sensor | 15 External Mirror Position Sensor |
| 6 Brake Pad Distance Sensor | 16 Transmission Speed Sensor |
| 7 Exhaust Gas Recirculation Sensor | 17 Steering Reach and Rake Sensor |
| 8 Turbo Waste Gate Sensor | 18 Wheel Speed (front & rear) |
| 9 Manifold Intake Sensor | 19 Headlamp Leveling Sensor |
| | 20 Fuel Card for Fuel Level Sensing |

Custom Commercial Vehicle Sensors

Types Available:

- Powertrain speed & position
- Brake wear
- Chassis level
- Ride height
- Steering torque & angle
- Fuel level
- Pedal position

Features:

- Contacting: resistive
- Non-contacting: VR, hall effect, xMR, inductive
- Interfaces: analog, PWM, SENT, SPI, CAN, PSIS
- Extensive simulation tools
- Global engineering, testing, manufacturing, and sales support
- All sites are IATF 16949 and ISO 26262 compliant
- Innovative & cost-effective solutions



Applications

- ABS wheel speed
- Accelerator pedal
- Electric Power Steering
- Brake pedal module
- Brake wear
- Chassis Level
- Electric park brake
- Fuel tank level
- Steer by wire
- Throttle position
- Transmission position
- Transmission speed
- Transfer case position
- Motor position
- Disconnect unit position

Vehicle Dynamics Sensors

Part #	Product	Contacting	Non-Contacting	N.C. Technology	Rotary	Linear
Steering						
6001	Absolute Steering Angle Sensor in Brackets (8 Turn Range)		•	AMR	•	
R---	Incremental Steering Angle Sensor		•	AMR	•	
R---	Combination Torque and SAS sensor	•	•	HE/AMR	•	
Chassis						
2007	Chassis Level Sensor	•			•	
R---	Non-Contacting Chassis Level Sensor		•	HE	•	
Braking						
3713	Brake Wear Sensor	•				•
R---	Non-Contacting Brake Wear Sensor		•	HE		•
2008	Air Brake Master Cylinder Position Sensor	•			•	
R---	Brake Pedal Sensor		•	HE	•	
R842	Brake Pedal Module Sensor		•	AMR	•	
R---	Passive ABS Wheel Speed Sensor		•	VR	•	
R---	Active ABS Wheel Speed Sensor		•	HE/AMR	•	

Engine & Powertrain Sensors

Part #	Product	Contacting	Non-Contacting	N.C. Technology	Rotary	Linear
0383	Exhaust Gas Recirculation	•			•	
8513	Exhaust Gas Recirculation		•	HE	•	
R041	Manifold Intake Sensor		•	HE	•	
2010	Contacting ETC Pedal Sensor	•				•
R---	Non-Contacting ETC Pedal Sensor		•	HE	•	
R---	Transmission Speed Sensor		•	HE/AMR	•	
1099	Diesel Injection Pump Sensor	•				•
R---	Fuel Level Sensor	•			•	

Comfort Sensors

Part #	Product	Contacting	Non-Contacting	N.C. Technology	Rotary	Linear
3713	HVAC Temperature Control	•				
3716X	Steering Reach and Rake Position Sensor	•				•
0473	External Mirror Position Sensor	•			•	
1017	External Mirror Position with Memory	•			•	
3048	Linear Motion Seat Position Sensor	•				•
1012	Linear Position Sensor - Headlamp Leveling	•				•
2003	Seat Position Sensor	•			•	

Automotive Grade Passive Components

Types Available:

- Inductors
- Transformers
- Power resistors
- Chip Resistor
- Power Resistors
- Current Sense Resistors
- EB-Welded Shunts
- Current sense resistors
- Trimpot® trimming potentiometers

Features:

- AEC-Q200 compliant
- TS 16949 factory produced
- Automotive temperature capable
- High quality and reputation



Applications

- Battery management
- Cameras
- DC/DC & AC/DC power supplies
- Diagnostic tools
- Electronic Control Modules (ECU)
- Infotainment, telematics, navigation, connected cars
- Instrument clusters
- Lighting
- Networking
- OBCs (On Board Chargers)
- Start-stop

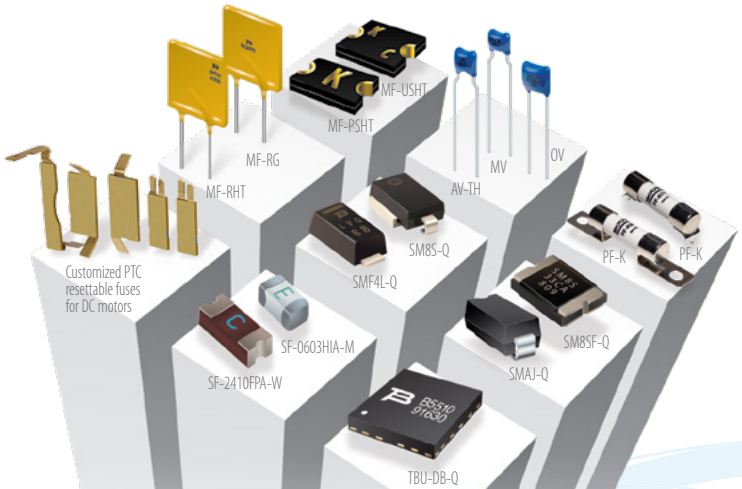
Automotive Grade Circuit Protection

Types Available:

- Multifuse® PPTC resettable fuses
- SinglFuse™ SMD fuses
- POWrFuse™ high-power fuses
- TBU® high-speed protectors
- Metal Oxide Varistors (MOVs)
- ChipGuard® MLVs
- Diodes
- LED shunt protectors

Features:

- Overcurrent protection for automotive and other applications
- IATF 16949 quality system
- Resettable PTCs suitable for application temperatures up to 125 °C
- SinglFuse™ SMD fuses suitable for application temperatures up to 150 °C
- AEC-Q101 compliant diodes
- AEC-Q200 compliant fuses
- Wide range of current ratings
- Dedicated automotive CP team
- Transient protection



Applications

- BMS (Battery Management Systems)
- Car alarm systems
- Cooling & HVAC systems
- Electronic Control Unit (ECU) input/output protection
- GPS shark fin antennas
- Infotainment, telematics and navigation input/output protection
- Load dump and other transient voltage protection
- Other DC motor applications
- Powerbus (mode protection) applications
- Power steering motors
- Seat adjustment motors
- Sunroof activation motors
- Window regulators

Our engineering and production centers

Engineering Centers



Bourns, Inc.

Riverside, California
U.S. Headquarters



Bourns Electronics GmbH

Taufkirchen, Germany



Bourns Kft.

Veszprém, Hungary



Bourns, Inc.

Auburn Hills, Michigan
USA

Production Centers



Bourns Kft.

Ajka, Hungary



Bourns Xiamen

Xiamen, China



Bourns de Mexico

Chihuahua, Mexico



Bourns de Mexico

Tijuana, Mexico

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