



BOURNS[®]
Automotive Division

Automotive Sensors

Commercial Vehicle Sensors

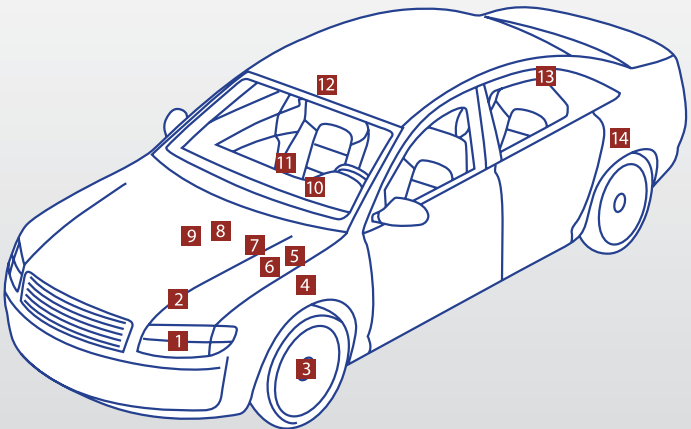
*Circuit Protection
Applications*


Automotive Sensors

The Bourns® Automotive Division has played a leading role in the design, development and manufacture of potentiometer sensors for over 60 years. At our engineering centers in Riverside/California, Sauerlach/Germany 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 nearly 4,400 employees located in 12 different Bourns-owned design and manufacturing locations worldwide.

Our research and development work combined with close collaboration with customers helps to ensure 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, 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 that are supplemented by competitive Hall Effect and 2 Axis Hall Effect technology. Bourns can assist in the selection of the most appropriate technology for your application specifications.

Bourns TS16949 certified quality system and Bourns Production System (BPS) helps 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.

- | | |
|---|--|
| 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 Airflap 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 | |

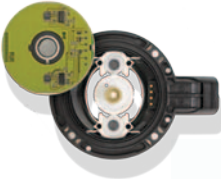
Automotive Sensors



Multiturn Steering Angle Sensor



Chassis Level Sensor



Steering Angle Sensor



Fuel Card for Fuel Level Sensor



Angle Sensor for EGR (Exhaust Gas Recirculation)



Transmission Speed Sensor



Pedal Angle Sensor



Torque Sensor for EPS Steering Gear

Vehicle Dynamics Sensors

Part #	Product	Contacting	Non-Contacting	NC Technology	Rotary	Linear
Steering						
6002	Absolute Steering Angle Sensor		•	AMR	•	
R---	Incremental Steering Angle Sensor		•	AMR		
P8539	SAS Sensor for Active Steering		•	AMR	•	
R---	Non-Contacting Torque Sensor		•	AMR	•	
R---	NC Torque Sensor with Angle Index Feature		•	AMR/HE	•	
R---	Clocksringfree NC Torque Sensor		•	HE	•	
R---	Clocksringfree NC Torque and Index Sensor		•	HE/HE	•	
	Clocksringfree NC Torque and Angle Sensor		•	HE/AMR	•	
R---	BLDC Motor Position Sensor		•	AMR	•	
Chassis						
R---	Non-Contact 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	NC 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.	•	

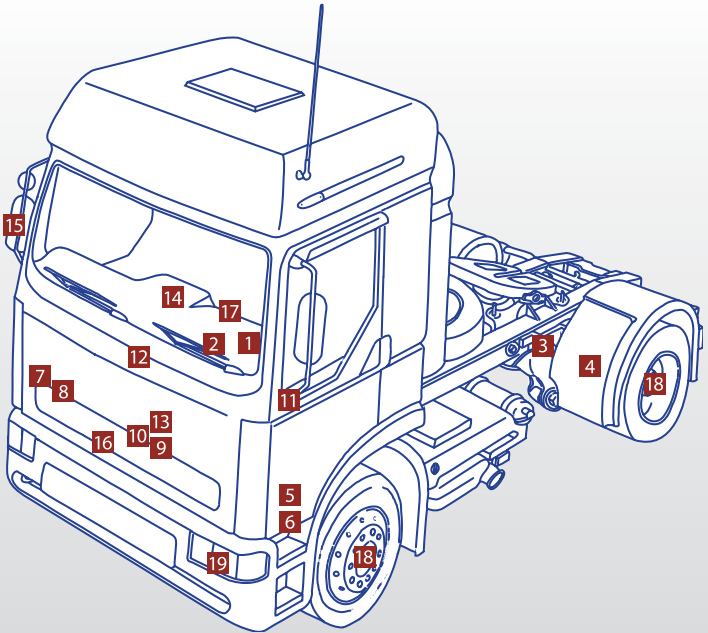
Comfort Sensors


Part #	Product	Contacting	Non-Contacting	NC Technology	Rotary	Linear
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	•			•	
R---	Spindle Gear Sensor - Rear Closure Systems			HE	•	
3048	Linear Motion Seat Position Sensor	•				•
1012	Linear Position Sensor - Headlamp Levelling	•				•
1015	Linear Position Sensor - Headlamp Levelling	•				•
R205	Non-Contacting Rear Door Position Sensor		•	HE	•	
R205	Seat Position Sensor	•			•	

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 independent sensor companies to supply Exhaust Gas Recirculation sensors for Euro II regulation truck engines; we are now supplying sensors for Euro 4 applications. These EGR sensors are based on either Bourns® proprietary ink or wiper system or alternatively our 2 Axis Hall Effect non-contacting technology, depending on the temperature profiles required. For high temperature, +180 °C operation, Bourns developed a contacting sensor ink system to perform within the constant 220 °C exposures while maintaining a 30 million full stroke life cycle demand. This capability is also suited to turbocharger position sensing 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.

- | | |
|---|--|
| 1 Steering Angle Sensor | 10 Throttle Position Sensor |
| 2 Differential Torque Sensor | 11 Pedal Position Sensor |
| 2 Non-contact 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 |

Commercial Vehicle Sensors



Hall Effect Based Linear Position Sensor



Magneto Resistance Based Angular Position Sensor



Chassis Level Sensor



Non-contact Throttle Position Sensor



Torque Sensor for EPS Steering Gear



Brake Wear Sensor



ABS Wheel Speed Sensor



Transmission Speed Sensor

Vehicle Dynamics Sensors

Part #	Product	Contacting	Non-Contacting	NC Technology	Rotary	Linear
Steering						
6000	Absolute Steering Angle Sensor		•	AMR	•	
R---	Incremental Steering Angle Sensor		•	AMR	•	
P8539	SAS Sensor for Active Steering		•	AMR	•	
R204	Eight Turn Steering Angle Sensor		•	AMR	•	
R---	Combination Torque and SAS sensor	•	•	HE/AMR	•	
Chassis						
2007	Chassis Level Sensor	•			•	
R----	Non-Contact Chassis Level Sensor		•	HE	•	
Braking						
3713	Brake Wear Sensor Product	•				•
R----	Non-Contact 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	NC 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	•			•	

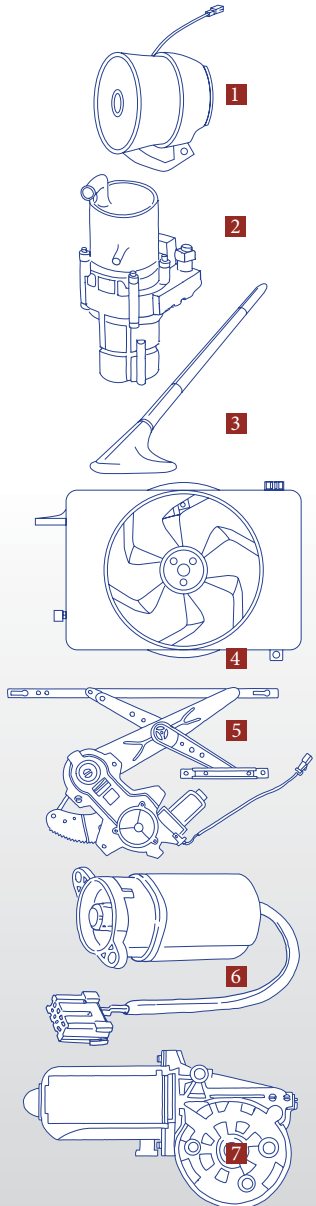
Comfort Sensors

Part #	Product	Contacting	Non-Contacting	NC Technology	Rotary	Linear
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	•			•	
3048	Linear Motion Seat Position Sensor	•				•
1012	Linear Position Sensor - Headlamp Levelling	•				•
2003	Seat Position Sensor	•			•	

Circuit Protection Applications

Passive electronic components constitute a major portion of growth in today's advanced automotive electronic systems. From electronic control units (ECUs) to zonal climate control, the demand for passive electronics technologies in the automotive industry continues to expand.

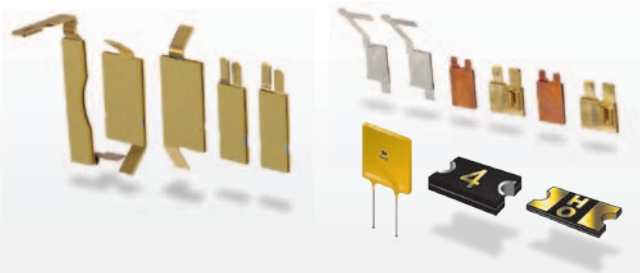
Bourns® Multifuse® Polymer PTC products offer solid state protection against over-temperature and/or overcurrent conditions. Designed specifically for automotive applications, the PTCs provide protection for application temperatures up to 125 °C. The resettable feature of the product allows the fuses to be located close to the load being protected instead of in a traditional fuse box. The product family operates under the TS16949 quality system to ensure all components are designed, developed, manufactured and installed to the highest automotive standards. In addition, the majority of the Multifuse® product line has been certified to AEC-Q200-Rev C. This specification defines the stress test requirements and reference test conditions for qualification of passive electrical devices in automotive applications as defined by a committee of automotive companies.



Typical examples of the electronic circuits in which Bourns® Multifuse® products are used are:

- Under the hood applications with new high temperature polymer PTC resettable fuses
- Steering column control modules
- Alarm modules
- Instrument panel/cluster protection
- Power Bus (e.g. AS System) - node protection
- Climate control units
- DC motor protection

Various types of Multifuse® PTC resettable fuses



Various motor applications



- 1 Car Alarm Systems:
- 2 Power Steering Motors:
- 3 GPS Shark Fin Antennae:
- 4 Cooling & HVAC Systems:
- 5 Window Regulators:
- 6 Seat Adjustment Motors:
- 7 Sunroof Activation Motors:

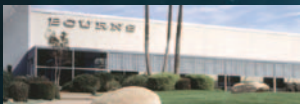
TVS Diodes, Multifuse® PTCs
Metal Alloy Shunts, Multifuse® PTCs
ChipGuard® MLVs, Multifuse® PTCs
ChipGuard® MLVs, Multifuse® PTCs
Metal Alloy Shunts, Multifuse® PTCs
Metal Alloy Shunts, Multifuse® PTCs
Metal Alloy Shunts, Multifuse® PTCs

BOURNS®

Automotive Division

Our engineering and production centers

Engineering Centers



Bourns, Inc.
Riverside, California
U.S. Headquarters



Bourns Sensors GmbH
Sauerlach, Germany



Bourns, Inc.
Auburn Hills, Michigan
USA

Production Centers



Bourns Kft.
Ajka, Hungary



Bourns Ltd.
Xiamen, China



Bourns de Mexico
Chihuahua, Mexico



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Tijuana, Mexico

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