

# Potentiometers, sensors & hybrids

## Product Overview

**BI technologies**

A subsidiary of TT electronics plc

**TT electronics**

BI Technologies Electronic Components Division



# Product Innovations for Global OEMs

BI Technologies' tradition of product innovation comes from listening to our customers. As a leading provider of standard and precision potentiometers for more than sixty years, we are often called upon to modify or customize an existing

model to serve a specific customer need. BI Technologies' expertise in thin and thick film manufacturing also makes us the preferred hybrid supplier for companies seeking custom, high reliability microcircuits that meet exacting performance,

cost and schedule requirements. These capabilities have resulted in an ever-expanding list of sensor and control design options for manufacturers worldwide.

## Sensors and Controls for Military & Aerospace

The avionics and aerospace industry has required some of the most sophisticated precision potentiometers ever devised and BI Technologies has been a leader in filling those needs. In virtually every case, a special product was required. For military applications, our products meet MIL-PFR-12934 for wirewound and MIL-PFR-39023 for non-wirewound models.

BI Technologies also has more than 30 years of design experience with military-grade hybrid products. Our chip and wire hermetically sealed microcircuits meet all the rigors of MIL-PRF-38534 and MIL-STD-883.

### Controls

Includes cabin environmental controls for commercial and military aircraft, ground equipment, service vehicles, helicopter stabilizer platform controls, communications systems, aircraft lighting system controls, army tank gunsights, nuclear submarine propulsion controls and gunship turret positioning.

### Feedback Sensors

Includes fin position sensing for missile controls, guidance control feedback, fluid level sensors and guided missile stage separation sensors.

### Position Sensors

Includes sensors for position of wing, aileron, flap or fins, nose up/down sensors for commercial and military aircraft and control surface position sensors.

### Hybrids

BI Technologies' hybrids are used extensively for fin position control, fuel monitoring displays, data communications and signal filtering as well as processing, voltage regulation and data conversion. These custom circuits perform a wide range of analog and digital control functions in military and aerospace applications.

Hybrid technology results in a high-quality, rugged product with tight linearity.



Hybrid microcircuits offer superior reliability over larger, heavier circuit boards and costly custom ICs.



BI Technologies meets the size and weight requirements of the most demanding missile avionics applications.



This aileron level sensor is an excellent example of our design capabilities for harsh environments.



# Automotive Sensors: Driving New Automotive Designs

BI Technologies offers a comprehensive range of automotive sensors using both contacting and non-contacting technologies. Our automotive products are manufactured in each of our nine global locations with headquarters and primary research facilities in Fullerton, California. Each facility is **ISO9000 and QS9000 certified**, with all resources organized to support the needs of the automotive business.

## Steering

Among the 'firsts' in our history, BI developed a combination sensor module for the first all-electric power steering system for a production vehicle. The sensor provides critical position and torque loading information to enable the steering system to be completely demand-driven, thus reducing power consumption and ultimately, fuel consumption.

Our steering wheel position sensor uses potentiometric technology to provide the precise position of the steering wheel to several onboard control systems, including ABS braking controls and active suspension components. Multiple housing configurations accommodate various shaft requirements, giving designers a great deal of flexibility in vehicle applications.

## Temperature

Our hybrid microcircuit technology enabled us to develop a compact temperature sensor module designed to interface with other vehicle systems. These modules can perform in environmentally challenging under-the-hood

applications, including temperature control for automotive air conditioning evaporators. The module provides feedback on the exact temperature within the system so that the compressor operates only when necessary.

## Other Applications

BI Technologies' capabilities extend to a variety of other automotive design functions, including seat position memory, pedal position, TPS, height leveling, smart cruise control, lumbar support, brake and EGR.

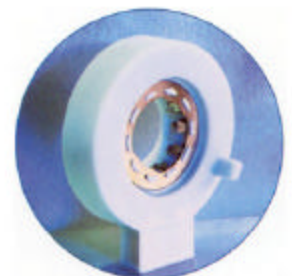


The EPS uses dual sensors to reduce the draw of electric power in power steering systems.



The Solid State Temperature Switch combines a highly accurate temperature sensor and a switch in a low cost, compact rugged unit.

The DTW steering wheel position sensor provides redundant and accurate output to several on-board control systems.





# On and Off-Highway Technology Solutions

## Truck, Mass Transit, Off-Road Applications

In this rapidly growing field, off-highway vehicle manufacturers are quickly moving to take advantage of electronic controls, sensors and feedback systems wherever they make the most sense. BI Technologies offers custom packages that meet the rigors of these vehicle applications.

Our potentiometer technology is employed in everything from steering wheel position sensors for golf carts and other electrically driven vehicle speed controls to rapid transit speed controls. We provide sensors for snowmobiles, heavy equipment and heavy-duty truck braking systems, as well as fuel level sensors, door position sensors for buses, and linkage position sensors.

## Rugged Packaging and Special Substrates

We have developed a portfolio of potentiometer resistive element technologies to meet customer requirements, including the application of high-temperature ceramics and highly stable conductive plastic materials to produce elements of exceptional quality and precision. This design flexibility permits high service or operating temperatures, high thermal conductivity, accommodation of irregularly shaped substrates and other special features including through holes, blind holes and internal cutouts.

BI Technologies has more than sixty years of experience in solving tough customer design problems. Our applications engineering group can assist you in developing a special substrate to meet your particular requirements.

Position Sensing

Feedback



Our linear actuation sensor technology is currently featured in heavy truck braking systems from leading European manufacturers.



The "Pie Pot's" rugged construction features a die-cast metal casing and wiper assembly that withstands the most rigorous vibration.



Consult our application engineering experts for assistance with special packaging and substrates.

# Reliable, Versatile Technology for Medical and Industrial Applications

BI Technologies' potentiometers have found many applications in patient care equipment, from table position controls for X-Ray, CAT scans and MRI machines as well as position controls for dental chairs and hospital beds. Their proven reliability has also made them suitable for more critical applications such as limit setting in blood pressure monitors.

In the field of instrumentation, proper control and analysis requires input from sensors, which are "near the action." BI's precision potentiometers have been and are excellent choices for many such applications. In one example, our products have been used in meteorological measuring equipment to provide feedback on wind speed and direction. Our product accurately provides the longest electrical travel and the highest degree turn - up to 353° - for any precision potentiometer.

Other sensor applications for our products include ships' roll indicator systems, hydrofoil rudder position feedback sensors, fuel level sensors, gyro compass sensors, robotics position sensors and X-Y plotter position sensors, just to name a few.

BI's precision potentiometers have been an integral part of industrial control systems, which has expanded to an enormous list of applications, including oilfield and refinery equipment, building heating and air conditioning controls, scientific and laboratory instrument controls, color controls for printing presses, music system amplifier controls, effects foot pedal for guitars, controls for gates in water treatment plants, theater lighting and stage controls.

For DC motor control, our motor potentiometers use a precision potentiometer connected to a motor by a gearbox and clutch. There are multiple standard potentiometer types and gear ratios available combined with a 10,700-RPM motor. Special features such as center taps, multi-taps, special shafts and special gear ratios can be produced on special orders, and several potentiometers can be ganged on a single rotor potentiometer shaft.

Our newest potentiometer designs include a spring return, linear actuation conductive plastic position sensor, which combines a rugged housing with a proven ceramic substrate to provide a workhorse miniature position sensor for automotive, robotics

and industrial automation applications. The sensor exhibits infinite resolution and a long life of five million actuations. This robust design eliminates the need for direct coupling in industrial applications, making it ideal for space-limited applications.

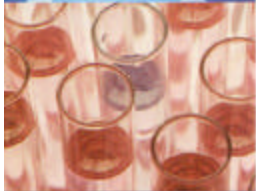
BI also offers hybrid microcircuit technologies, such as power modules, that are ideal for motor drive and control circuitry. Custom and standard modules are available to provide drive to motors, including universal and three-phase brushless configurations.

DC motors

Robotics

Imaging

Audio/lighting systems



The wireless weather monitor photo was provided by Davis Instruments.



BI offers single turn and multiturn conductive plastic, hybrid & wirewound precision potentiometers in a multitude of housings and pin configurations to meet your design needs.



Multiturn potentiometer models include up to 40 turns with special resistance values, tolerances and linearity available.



This miniature position sensor provides accurate linear position feedback in an extremely small area.



# TT electronics/B Technologies: Our Commitment to Innovation

The evolution of applications for precision potentiometers is ever expanding. The majority of customer application efforts have resulted in a customized or modified potentiometer that has been created to serve a specific customer requirement. We are committed to provide this kind of customer service in a cost-effective manner.

We can optimize your design based on your application and requirements. We may know of many materials not normally used, which can solve problems for you if we are cognizant of all the details of the application. Electrical, mechanical, operating, testing and other considerations are important factors that can impact potentiometer performance. Knowledge of these characteristics is critical to identifying the proper, cost-effective solution to your particular application. If you are unsure about your requirements, do not hesitate to call and discuss them with one of our BI Technologies application engineers.

Microcircuit modules are also being used in an increasing number of applications. Our military and commercial hybrids accommodate a wide variety of analog and digital control circuits. In small to mid-size assemblies, our ceramic substrate-based modules offer price competitive solutions along with quality and design advantages.

Listening to our customers is the reason BI Technologies is the preferred choice of global manufacturers. Our ability to anticipate and service customer needs has been the source of our reputation. To receive more information on our products and get fast answers to your tough design questions, visit our web site at [www.bitechnologies.com](http://www.bitechnologies.com) or contact our nearest office.



Manufacturing locations and worldwide sales offices on three continents enable BI to provide real-time service to customers globally.



Our microcircuit quality, engineering and manufacturing systems are certified to QS 9000 and are listed on the QML-38534 since 1989 for custom circuits.



Our carefully controlled manufacturing processes and built-in process checks provide excellent quality to customers while reducing cycle time.



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