



# Technical Bulletins

## GMR Switch

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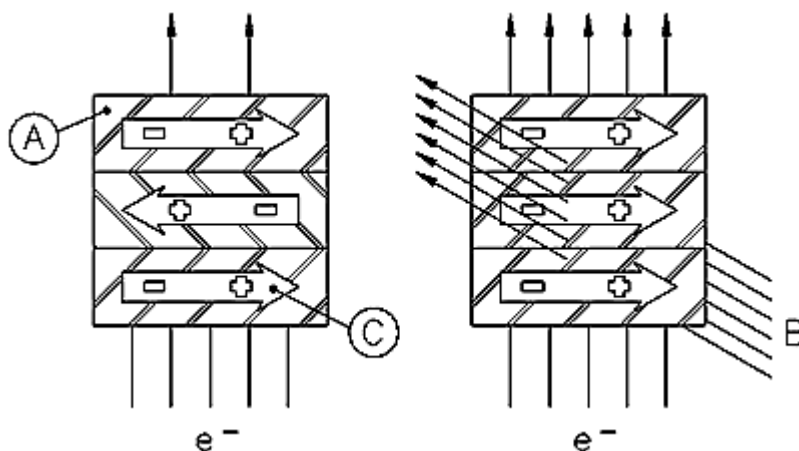
The Bimba GMR switch is one of the smallest solid state switches in the pneumatic industry. It mounts into tracks that are incorporated in the body of the cylinder. The GMR switch has a low profile, which does not interfere with cylinder mounting.

Many pick and place machines for electronic assembly houses use very small, compact pneumatic cylinders. Space is tight in these machines, requiring cylinders to be mounted in close proximity to each other, with little to no room in-between. With cylinder mounting this tight, position sensing switches need to be very small. The Bimba GMR switch has a cylindrical body that is not much larger (in diameter) than the wire attached to the switch. The body of the switch slides into a track that is a part of the cylinder, and does not protrude above the profile of the cylinder, making this a great switch for this application.

Circuit protection features are included in this switch. The switch has been designed to be resistant to over voltage, reverse polarity and electrical transients. These features help to increase the life of the switch.

The Bimba GMR switch utilizes a new solid state sensor technology. The new sensor technology provides symmetrical windows and hysteresis. Window symmetry simplifies switch setup by bringing switch turn "ON" and turn "OFF" points for both extend and retract, closer together.

GMR (Giant Magneto-Resistance) is the sensing technology used in this switch. It is more sensitive to magnetic fields than Hall Effect sensors. GMR sensors have found their way into a number of industries, particularly the computer industry. This new sensing technology is the driving force behind hard drives that now store a giga-byte or more of information.



GMR technology is based on a discovery that the direction of electron spin in certain metals can be shifted when in the presence of a magnetic field. (See diagram) A GMR sensor is made from multiple layers (A) of a Nickel/Iron compound. Each layer is magnetically opposed (C) to its adjacent layer. Current ( $e^-$ ) flowing through this material will encounter much resistance. When a magnetic field (B) is

applied to this material, the layers become magnetically aligned. This alignment reduces the resistance of the material, allowing for greater current flow through the material. This change in resistance produces a voltage potential in a resistor network, which is amplified to control a switching output transistor.

The GMR switch is available for use on the EF1, PneuMoment™ and Twin Bore cylinder lines. This switch comes with a standard wire lead lengths of 24 inches. Longer wire lead lengths and quick connect cables are also available

The information presented is in Bimba's best engineering opinion and should be used for reference only. Recommendations derived should be verified under actual operating conditions. Bimba reserves the right to change specifications without prior notice.

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