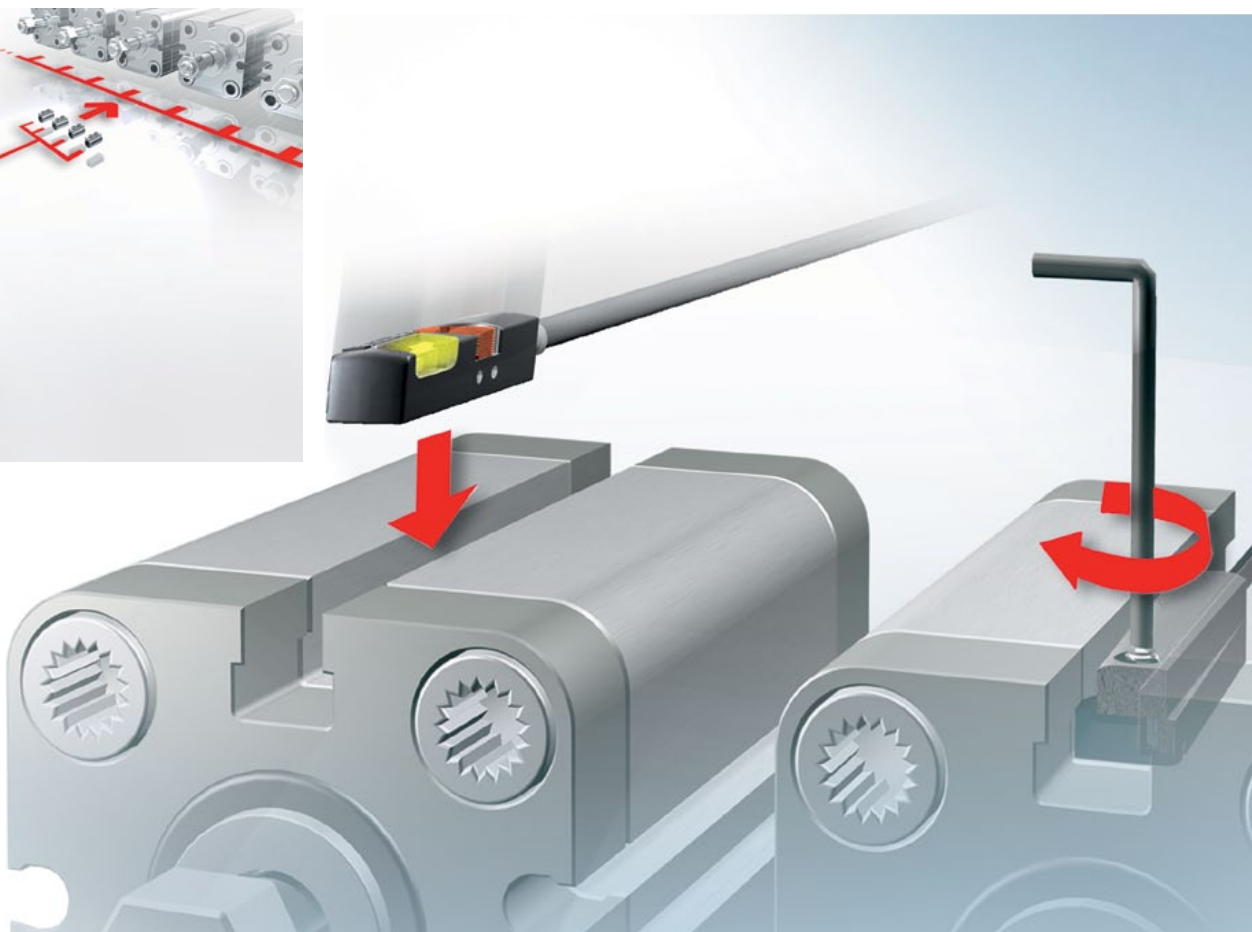
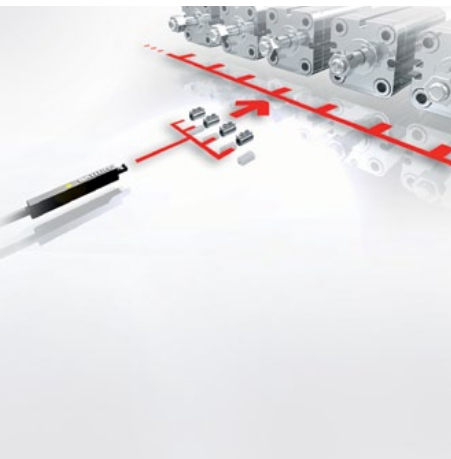


BALLUFF

sensors worldwide

BMF Sensors for Pneumatic Cylinders

Reliable upgrade from failure-prone reed and Hall Effect switches





Sensors for Pneumatic Cylinders

Move up to reliability...move up to Balluff BMF



Cylinder switch failures got you down?

Today's pneumatic cylinders are compact, reliable, and cost-effective prime movers for automated equipment. Unfortunately, they are often provided with unreliable reed or Hall Effect switches that fail well before the service life of the cylinder itself is expended. Too often, life with pneumatic cylinders involves continuous effort and cost to replace failed cylinder position switches. As a result, some OEMs and end users have abandoned magnetic cylinder switches altogether in favor of more reliable—yet more costly and cumbersome—external inductive proximity sensors, brackets, and fixed or adjustable metal targets. There has to be a better way!

Fortunately, there is. Balluff's magnetic field cylinder sensors are based on non-contact, solid-state sensor technology that is compatible with both reed and Hall Effect magnetic pole orientations, making them the ideal replacement for standard magnetic switches. Electrically rugged, they feature short circuit protection, overload protection, and reverse polarity protection...all backed by Balluff's exclusive Lifetime Warranty. Improved sensor performance and better reliability results in less downtime and increased productivity. With Balluff's magnetic field sensors, you install and forget them.

Balluff BMF Magnetic Field Sensors

- Proven magnetoresistive (MR) and giant magnetoresistive (GMR) technologies
- Compact size, perfect for short stroke cylinders and mini grippers
- Low hysteresis, precise switch points
- Shock and vibration resistant
- High noise immunity
- Reliable position detection, even at high speeds
- Lifetime warranty

BMF = No More Failures

- No moving parts to wear out
- No contact wear/pitting/burning
- No contact bounce
- No slow response time
- No double switch points

Lifetime warranty

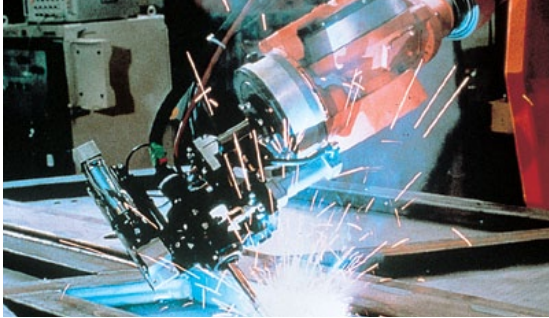
Make the switch to Balluff BMF magnetic field sensors and never pay to replace the same cylinder sensor again.



Sensors for Pneumatic Cylinders

Reduce installation time and sensor costs with Balluff's BMF V-Twin®

The toughest applications demand the toughest Balluff BMF magnetic field sensors.



Welding applications

Balluff magnetic field sensors are available in weld field immune (WFI) versions that can operate reliably in AC welding fields as strong as 200kA/m with no false signals or electrical damage. The weld field immune sensors are available in metallic housings to further guard against hot weld spatter that would melt into a plastic-bodied sensor.

Extreme temperatures

Extreme temperatures can shorten the life of a sensor; most manufacturers' sensors are rated for 70° C. Balluff magnetic field sensors can reliably operate in temperatures as low as -40° C and as hot as 105° C. All standard magnetic field sensors are rated for 85° C, except for reed versions.

Metal housings

Balluff magnetic field sensors with metal housings are built to survive the most abusive applications. Impact, abrasion and harsh environments can destroy standard plastic bodied sensors. Metal housings that are weld field immune or have extended temperature ranges can extend the life of the sensor in the most aggressive applications.

Connections made easy

Balluff's magnetic field sensors are available with a pre-wired cable or with an M8, M12, or M5 integral/pigtail connector. Pigtail connector versions have 0.3 meter length standard, although other lengths are also available. Many styles available with V-Twin.



Balluff's V-Twin® magnetic field sensors provide two sensors with a single connector in either an M8 or M12 configuration. The BMF V-Twin is available in several sizes and form factors to cover applications from grippers and short stroke cylinders to C-Slot, T-Slot, round, and tie rod cylinders—in some cases without requiring additional mounting brackets. Realize sensor and connection savings of 30% or more!



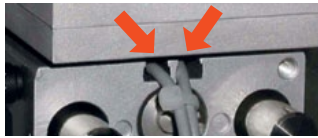
Substantial savings when using two sensors on one cylinder

- One, four-conductor cable versus two, three-conductor cables
- Less installation hardware
- Fewer wiring terminations
- Less installation time
- Lower initial costs compared to two separate sensors
- Double the number of sensors into a multiple interface block or sensor hub



Sensors for Pneumatic Cylinders

C-slot and T-slot cylinders: compact sensors for position detection



Balluff's compact BMF sensors are designed to fit either C-slot or T-slot extrusions and require no additional brackets for mounting. These sensors fit flush into the slot, offering better sensor protection...nothing sticking out and nothing in the way. Flush mounting sensors make installation in space critical applications easier and less time consuming. In addition, cable clips are included for cleaner cable routing and better strain relief.

Position detection with compact sensors for C-slots



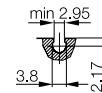
BMF 204—Designed for 3.8 mm C-slot

BMF 214—Designed for 4 mm C-slot

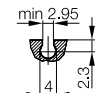
- Slides into the C-slot from the end
- Superior holding strength
- Miniature design for short stroke cylinders and grippers
- Precise, accurate positioning



3.8 mm (BMF 204)



4 mm (BMF 214)



BMF 243—Easy installation for C-slots

- Installs from above into the slot—drop-in installation
- Superior holding strength
- Compact design
- Precise, accurate positioning



Position detection with compact sensors for T-slots



BMF 235—The new standard for every T-slot

- Large, ultra-bright LED for easy diagnostics
- Installs from above into the T-slot—drop-in installation
- Installs with standard screwdriver or 1.5 mm Allen wrench
- Short, compact design with greater holding strength



BMF 307—Proven holding strength and performance

- Slides into T-slot from the end
- Solid state or reed switch option
- Secure hold in the slot
- One piece, bracketless design



BMF 315—Smallest weld field immune sensor on the market

- Installs from above into the slot—drop-in installation
- Metal housing available
- Standard and Weld Field Immune versions
- Weld Field Immune version with LED in the connector

Tie rod and round body cylinders

T-slot sensors with “stay put brackets” offer solutions for tie rod and round body cylinders.

BMF 235 – tie rod



BMF 235 – round body



Sensors for Pneumatic Cylinders

Magnetic field sensors with flexible mounting systems

Built around the concept of “one sensor, many brackets”, Balluff’s BMF magnetic field sensors with flexible mounting systems offer a wide range of solutions to fit a variety of manufacturers’ cylinders. Many of the brackets are “stay put brackets”, meaning that the switch point setting is maintained by the bracket—even when the sensor itself is replaced. One sensor type can be adapted to fit many different cylinders, reducing spare parts inventory and costs.



BMF 103—Optimized for short stroke cylinders and grippers

- Perpendicular mounting for very short linear footprint
- Extremely compact size—shortest housing on the market
- Schunk gripper versions available (tuned for Schunk magnets)
- Two sensors can be installed as close together as 5 mm



BMF 303—Miniature, flush mounting

- Flush mounting—disappears into the slot
- Precise, accurate positioning
- Schunk gripper versions available (tuned for Schunk magnets)



BMF 305—The universal solution

- Widest variety of mounting brackets
- Weld Field Immune versions
- Metal housing versions
- Extended temperature ranges



BMF 21—Integrated swinging arm bracket

- Ideal for tie rod and external rail profiles
- Self-adjusting brackets fit a variety of cylinder sizes
- LED function indication
- Pre-wired cable or integrated M08 connector



BMF 32—Made for the most demanding applications

- Rugged, super tough design
- Offered only in metal housings
- Weld Field Immune versions
- Integral metal connectors with porthole LEDs



Tubular Proximity Style: ultra-long range sensing

- Sensing range up to 90 mm, depending on power of magnet
- Reacts only to magnetic fields
- Stainless steel housings—wide temperature range
- Precision switching option for lateral magnet approach

Bracket variety*

C-slot (size 10 slot)	BMF 103	BMF 303		
C-slot (round slot)	BMF 103	BMF 303		
T-slot	BMF 103	BMF 303	BMF 305	
Round cylinder	BMF 103	BMF 303	BMF 305	BMF 235 BMF 307
Dovetail slot	BMF 103	BMF 303	BMF 305	
C-slot large	BMF 303			
with rail/ SMC slot-A and slot-B	BMF 303	BMF 305		
Tie rod	BMF 305 BMF 21	BMF 305	BMF 235, 307,315	BMF 32

* visit online cylinder resource center for complete application information
www.balluff.us/bmfcenter

Sensors for Pneumatic Cylinders

Know your cylinder? Find your sensor.

Balluff's exclusive, easy-to-use online Pneumatic Cylinder Sensor Resource Center is designed to help you select the best solution for specific cylinder models.

The web-based interface will generate up to three sensor recommendations for each application. The Resource Center is designed to help you make a preliminary selection of products so you can download sensor datasheets and mounting bracket installation instructions.

The Resource Center will reduce your design time, aid you in component standardization, and ultimately provide you with a reference guide that will help reduce downtime when a replacement sensor is needed.

Visit:

www.balluff.us/bmfcenter

Pneumatic Cylinder Sensor Resource Center

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Balluff Magnetic Field (BMF) sensors are based on robust, solid-state magneto-resistive technology. Available in metal or plastic housings, they have short circuit / overload / reverse polarity protection and come with an industry-leading LIFETIME warranty. Options include weld field immunity, application-specific brackets, and a variety of connection means including Balluff's exclusive V-Twin™ dual-sensor split connector system. The V-Twin will cut your hook up time and reduce your material costs by eliminating extra cordsets and Y-splitters when connecting to field I/O blocks.

Let us convince you that Balluff can be your #1 cylinder sensor supplier!!!

To access the BMF Center...
You need a BMF user name!

Don't have a BMF user name?
Signing up is easy.

[Signup for BMF user name](#)

Already have a BMF user name?
Sign in here.

Email Address:

Password:

☐ Remember my ID and password?

[Login](#)

[Forgot your password? Please, click here.](#)



Pneumatic Cylinder Sensor Resource Center

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You need a BMF user name!

Don't have a BMF user name?
Signing up is easy.

[Signup for BMF user name](#)

Already have a BMF user name?
Sign in here.

Email Address:

Password:

☐ Remember my ID and password?

[Login](#)

[Forgot your password? Please, click here.](#)



1. Log-in or sign-up for BMF user name.

Pneumatic Cylinder Sensor Resource Center

Balluff's online Pneumatic Cylinder Sensor Resource Center is designed to help you select the best solution for specific cylinder models and will generate up to three recommendations. This selector is designed to help you make a preliminary selection of products. This tool will reduce your design time, aid you in product standardization, and ultimately provide you with a reference guide that will help reduce downtime.

IMPORTANT: Please test a sample of the recommended sensor and/or bracket on the actual cylinder to validate correct fit and switching function. Balluff makes every effort to keep this selection tool up to date, but we have no control over running changes that may be made to any given cylinder. To avoid surprises...test a sample.

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Let us convince you that Balluff can be your #1 cylinder sensor supplier!!!

Step1: Select Pneumatic Cylinder

Manufacturer: Cylinder Family:

Parker P1M

Cylinder Diameter:

T-Slot

Can't find your cylinder? click here >>

2. Select your pneumatic cylinder.

3. Select sensor family.

Step1: Select Pneumatic Cylinder

Manufacturer: Cylinder Family:




Parker P1M

Cylinder Diameter:

T-Slot

Can't find your cylinder? click here >>

Step2: Select Sensor Family

Sensor Family	BHF 235	BHF 303	BHF 103
Product Image			
Main Bracket:	T-Slot Drop In - No Bracket Required	H066	H065
Bracket Installation:		BHF 203-HW-66.pdf	BHF 103-HW-65.pdf
Additional:			
Description:	Drop-in family for T-slot cylinders. Built-in mounting hardware, no bracket required.	For small diameter cylinders. Disappears into mounting slots, plastic housing.	For extreme short-stroke cylinders. plastic housing.
Options:	Cable out, and digital versions available	Cable out, digital and V-Twin versions available	Cable out, digital and V-Twin versions available

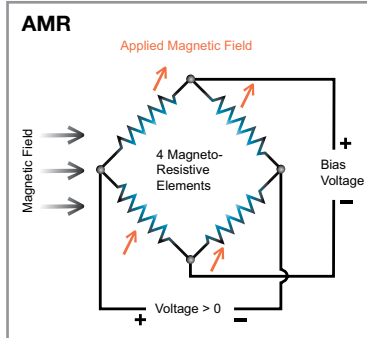
Sensors for Pneumatic Cylinders

Magnetic field sensing technology comparison

Balluff technologies

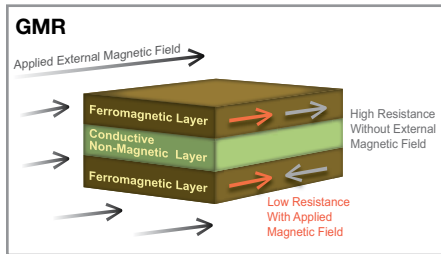
Magnetoresistive (AMR)

The operating principle of AMR magnetoresistive sensors is simple: the sensor element undergoes a change in resistance when a magnetic field is present, changing the flow of a bias current running through the sensing element. A comparator circuit detects the change in current and switches the output of the sensor. The magnetoresistive element responds with a robust 3-4% change in bias current. The practical magnetic field strength required to operate a magnetoresistive sensor can be as low as 15 Gauss.



Giant Magnetoresistive Sensors (GMR)

The latest magnetic field sensing technology is called giant magnetoresistive (GMR). Compared to AMR technology, GMR sensors have an even more robust reaction to the presence of a magnetic field, at least 10%. Due to their high sensitivity, less physical chip material is required to construct a practical GMR magnetic field sensor, so GMR sensors can be packaged in much smaller housings for applications such as short stroke cylinders.



AMR and GMR Advantages

- Reacts to axially and radially magnetized magnets
- No double switch points
- Superior noise immunity
- Fast
- Vibration resistant
- Smaller physical size
- Overload protected
- Reverse polarity protected
- Short circuit protected
- Low magnetic strength required
- Reliable
- Standard 24V DC operation

Other technologies

Reed Switches

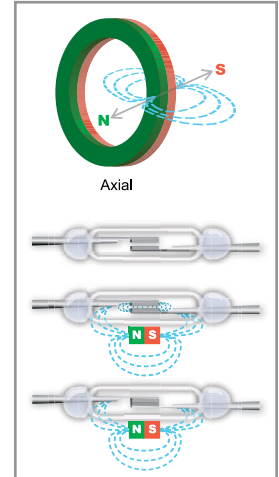
The simplest magnetic field sensor is the reed switch. This device consists of two flattened ferromagnetic nickel and iron reed elements, enclosed in a hermetically sealed glass tube. As an axially aligned magnet approaches, the reed elements attract the magnetic flux lines and draw together by magnetic force, thus completing an electrical circuit.

Reed Advantages

- Low cost
- AC or DC – two wire
- No power required
- High noise immunity

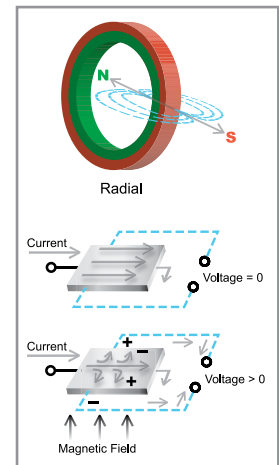
Reed Disadvantages

- Slow
- Finite life, prone to failure
- Double switch points
- Contact bounce
- Vibration sensitive
- High magnet strength required
- Reacts only to axially magnetized magnets



Hall Effect Sensors

Hall Effect sensors are solid-state electronic devices. They consist of a voltage amplifier and a comparator circuit that drives a switching output. As a radially oriented magnet approaches, the magnetic field is perpendicular to the current flow through the Hall element. The presence of the perpendicular magnet pushes the electrons out of their straight-line path and towards one side of the chip. The imbalance of electron charge thus creates a potential voltage across the Hall Effect element. The small micro-voltage that is created is proportional to the strength of the magnetic field. Once the voltage amplitude generated across the chip has satisfied the threshold level of a comparator circuit, the sensor output switches on.



Hall Effect Advantages

- Electronic
- Fast
- Vibration resistant

Hall Effect Disadvantages

- High magnet strength required
- Reacts only to radially magnetized magnets
- Double switch points
- Often lack electrical protection



Systems and Services



Industrial Networking and Connectivity



Industrial Identification



Object Detection



Linear Position Sensing and Measurement



Fluid Sensors



Accessories

USA

Balluff Inc.
8125 Holton Drive
Florence, KY 41042
Phone: (859) 727-2200
Toll-free: 1-800-543-8390
Fax: (859) 727-4823
E-Mail: balluff@balluff.com

Canada

Balluff Canada, Inc.
2840 Argentinia Road, Unit #2
Mississauga, Ontario L5N 8G4
Phone: (905) 816-1494
Toll-free: 1-800-927-9654
Fax: (905) 816-1411
E-Mail: balluff.canada@balluff.ca

Mexico

Balluff de México SA de CV
Anillo Vial II Fray Junípero Serra No. 4416
Colonia La Vista Residencial.
Querétaro, Qro. CP76232
Phone: (+52 442) 212-4882
Fax: (+52 442) 214-0536
E-Mail: balluff.mexico@balluff.com