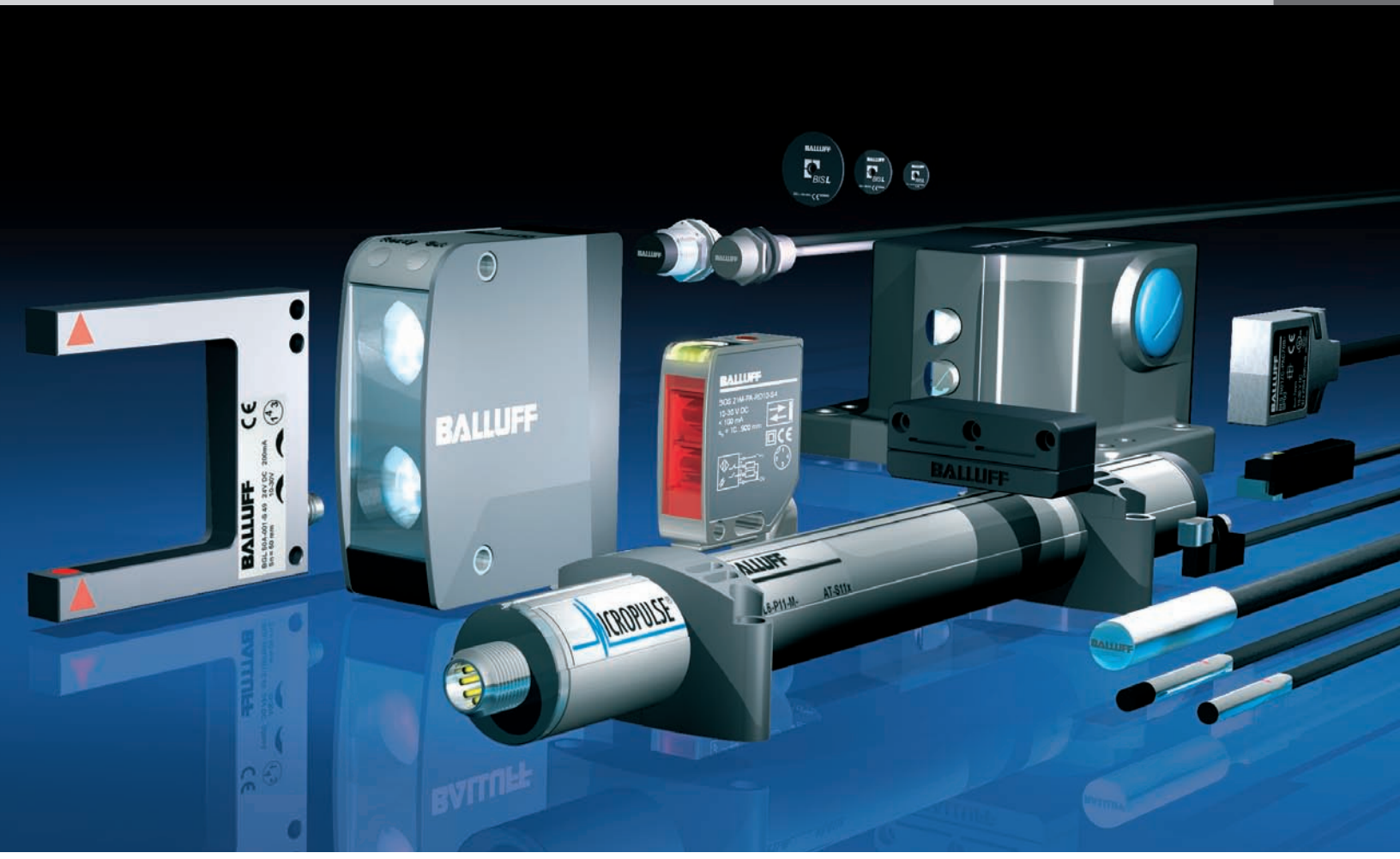
BALLUFF

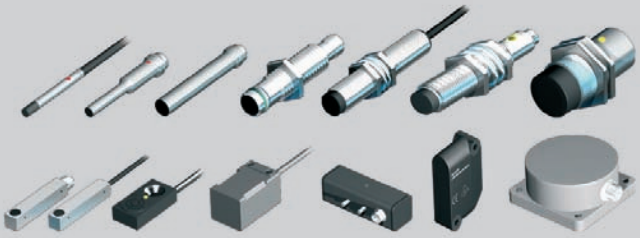
# Sensor Selection Guide

Product overview brochure



## Inductive Sensors

Balluff offers a variety of inductive sensor solutions: standard designs, block styles, extended range, weld field-immune, specialized sensing – whatever the need, there's a Balluff inductive sensor that will provide optimum service. Balluff sensors are found in machine tool equipment, the plastics industry, textile production machines, woodworking, automotive manufacturing – wherever there is a need to automate. From Mini to Maxi block style sensors from 5 x 5 mm to 80 x 80 mm, and tubular housings from 3 mm to 30 mm sizes, Balluff inductive sensors monitor, control, measure, and automate production sequences with high reliability and freedom from wear.

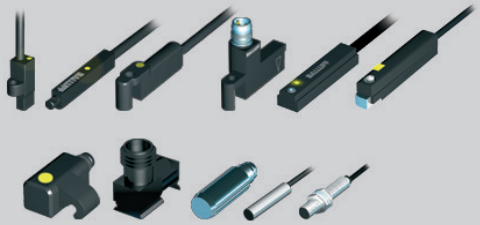


## Photoelectric Sensors

Balluff photoelectric sensors are designed to provide specific process tracking, position information, and part quality solutions in all areas of the automation process. They are especially suited for applications in robotics, assembly, and material handling. Along with tubular housings both in plastic and metal sized from 5 mm to 30 mm, Balluff also offers a range of sensors in rigid, block-shaped plastic housings. From classic diffuse, retroreflective, and thru-beam types to more specialized versions, the Balluff photoelectric line will handle the toughest applications.

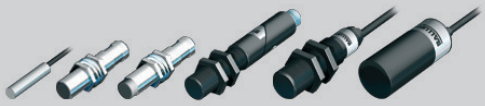
## Cylinder & Valve Sensors

Magnetic field sensors are primarily used for monitoring the piston position on pneumatic cylinders. The magnetic field of a magnet embedded in the piston is detected by the sensor through the cylinder housing wall. Thanks to their non-contact position sensing capability, these electronic magnetic field sensors are reliable, wear-free, and are finding ever-wider use. Balluff offers perfect solutions for a variety of typical pneumatic cylinders. Balluff's universally compatible range of cylinder sensors with their engineered mounting bracket kit concept will fit virtually any cylinder shape or size.



## Capacitive Sensors

Capacitive sensors detect the change in capacitance caused by the approach of an object in their electrical field. These sensors find broad use in sensing metals, plastics, or liquids and are used extensively in applications involving packaging, plastics handling, and liquid level sensing.

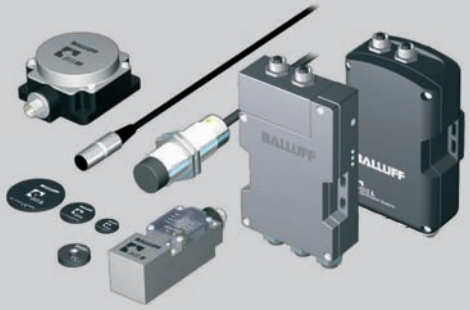


## Remote Systems

Sensors are often required to rotate or follow the movement of a machine component or part being manufactured. This often results in repeated twisting and tangling of wiring, resulting in cable wear and ultimately failure. Balluff power remote systems consist of a transmitter and receiver unit that transmits power and sensor information through an air gap. They eliminate wiring failure while providing noise and contactless wear-free operation even in extreme conditions.

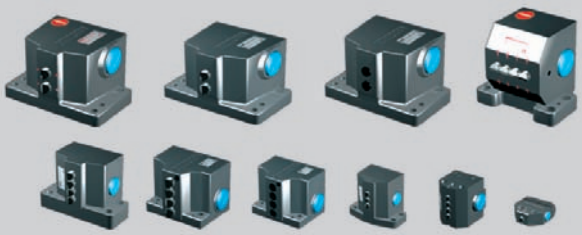
## ID Systems

Balluff provides a range of RFID systems to track work in progress and provide feedback on in-process testing. Computer-assisted manufacturing, modern warehouse systems, flexible assembly lines, plus logistics and distribution systems benefit from Balluff BIS RFID systems. BIS components are available in plastic or metal housings and plug-in versions to meet any application requirement. Balluff has developed a complete line of easy to use read-only systems that interface directly into a PLC through discrete inputs or an RS-232 interface. These systems offer data reliability and environmental ruggedness not found in bar code systems. Read-only systems are ideal when product data are stored centrally in a control system and referenced by a code contained on RFID tags located on products, parts, or pallets.



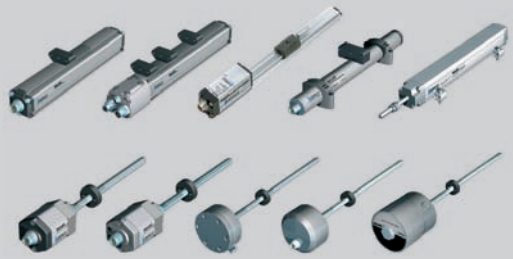
## Mechanical Switches

Engineered for the most demanding switching requirements and harsh environmental conditions, Balluff cam switch systems are still the preferred solution of automatic machinery builders around the world. Key applications include control of automatic machine tools, overtravel limiting, and robot dynamic zone control.



## Transducers

Balluff Micropulse linear position transducers provide highly accurate and reliable position control signals. Balluff's non-contact magnetostrictive technology means performance does not degrade over time, as with linear potentiometers. Micropulse transducers are available with a variety of housing styles and electrical outputs to fit a wide range of applications and are very popular in the lumber industry, plastic injection and blow molding, tire and rubber manufacturing, stamping presses, die casting, and all types of automated machinery where a continuous, absolute position signal is required.



## Accessories

A compete range of accessories helps save costs and provides optimum sensor integration in any environment. In addition to protecting Balluff sensors, our accessory line is designed to permit precise, lasting sensor location positioning while permitting quick sensor change out at any time.

## Connectivity Products

A comprehensive line of cables, cordsets, and connection blocks complement our product line, facilitating sensor use in every area of automation. Balluff offers custom application expertise on request.

# Balluff Means Industry Expertise

## Automotive

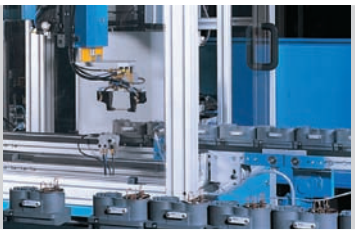
From stamping, to powertrain, to final assembly, Balluff's rugged products have proven themselves up to the task.

Rugged, long-range inductive proximity sensors

The industry standard multiple mechanical switches

Accurate and reliable photoelectric sensors

Ultra-reliable RFID systems



## Automated Assembly

Machines are getting smaller, faster, and smarter. Fortunately, so are Balluff's sensing and ID products.

Miniature, long-range inductive proximity sensors

A new level of reliability and performance from pneumatic cylinder position sensors

Specialized photoelectric sensors

Ultra-reliable RFID systems with the latest in connection options

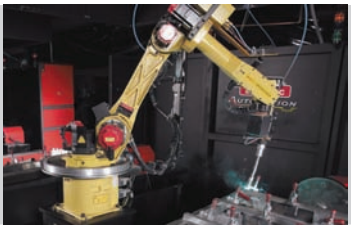
## Manual Assembly

Here, error proofing is the name of the game. It takes a sensor company with the products and the know-how to solve real-world issues.

Rugged, long-range inductive proximity sensors

Ultra-reliable RFID systems with the latest in connection options

All types of lasers, true color, and UV sensors



## Welding

Monitoring the position of parts and clamps in welding environments requires specialized products for sensor longevity. Our products and accessories enable maximum uptime.

Special coatings provide weld-field immunity with Balluff's weld-specific proximity sensors

Dynamic zone restriction using Balluff multiple mechanical switches

A new level of reliability and weld-field immunity with pneumatic clamp sensors

Eliminate troublesome connection problems with Balluff's power remotes

## Metal Forming

Balluff has the in-die sensing critical to protect dies from damage, allow more strokes, and provide error proofing during the forming process.

Miniature tubular and block style sensors are easily bunkered within the die

Long range lasers and self-contained thru-beams for slug-out and part-out detection

## Machine Tool

Balluff has the rugged, reliable sensors and ID solutions to meet the requirements of this industry. Tool ID has proven itself as an effective method for error proofing setup.

Steel face and long-range inductive proximity sensors

Ultra reliable RFID systems track tool data such as tool type, presetter offsets and usage history

## Tire and Rubber

Given the amount of motion involved, Balluff position feedback products are preferred worldwide.

Rugged, long-range inductive proximity sensors for machine feedback

Reliable position feedback on hydraulic sensors with Micropulse® magnetoresistive linear transducers

Long-range lasers for error proofing and position feedback

## Wood

You need heavy duty sensors to meet the position and handling equirements of this rugged industry.

Rugged, long-range inductive proximity sensors for machine feedback

Reliable position feedback of saw blades with Micropulse® magnetoresistive linear transducers

Long-range lasers for positioning and UV sensors for wood grading

## Plastics

Balluff's line of feedback devices effectively handle the position feedback requirements of injection and blow molding equipment.

Reliable detection of plastic parts and pellets with Balluff's capacitive sensors

Reliable position feedback with Micropulse® magnetoresistive linear transducers

Rugged, long-range inductive proximity sensors for machine feedback




| 18 mm Diameter | 18 mm Diameter | 18 mm Diameter | 30 mm Diameter |
|---|---|---|---|
| **18K** | **18KF/18KW** | **18M/18E** | **30M** |
| Threaded | Combination Threaded | Threaded | Threaded |
| Plastic | Plastic | Metal | Metal |
| Straight or Right Angle | Straight or Right Angle | Straight or Right Angle | Straight |
| 8 m, 10 m, 12 m | 10 m, 15 m | 16 m | |
| Class I Laser – 60 m | Class I Laser – 50 m, 60 m | Class I Laser – 50 m, 60 m<br>Class II Laser – 50 m | |
| 2 m, 3 m | 5 m | 2 m, 4 m | |
| 1.5 m, 2 m, 3 m | 3 m, 4.5 m | 2 m | |
| Class I Laser – 12 m | Class I Laser – 9 m, 16 m | Class I Laser – 9 m, 16 m | |
| 250 mm, 300 mm<br>350 mm | 80 mm, 100 mm, 350 mm,<br>400 mm, 700 mm | 100 mm, 200 mm, 400 mm<br>1000 mm | 2 m |
| Class I Laser – 350 mm | Class I Laser – 250 mm, 350 mm | Class I Laser – 250 mm, 350 mm | |
| | 50 mm to 100 mm | 10 mm to 120 mm<br>40 mm to 120 mm | |
| | 40 mm to 100 mm | | |
| | 80 mm, 100 mm | | |
| | 50 mm to 100 mm | | |
| | 8 mm to 20 mm | | |
| | 10 mm | | |
| | 1.7 m | | |
| | Yes | Yes | |
| DC or AC | DC | DC or AC | DC |

**www.balluff.com/photoelectrics**

## 18KF/8KW/18M Class I Lasers

- Sensing modes include:
  - 50 m, 60 m Thru-Beam
  - 9 m, 16 m Polarized Retroreflective
  - 250 mm Diffuse
- Highly visible safe Class I Laser emission
- Simple potentiometer adjustment
- Straight or right angle versions
- M12 connector or cable out

## BOS 2K Sub-Miniature Photoelectric Family

- Sub-miniature housing 20x7.5x10 mm
- Sensing modes include:
  - 1.2 m Thru-beam
  - 3 m Retroreflective
  - 50 mm Diffuse
  - 15 mm, 30 mm Precision Background Suppression
- Laser-like, visible light source for precision parts detection
- M8 pigtail connector or cable out

# Block Style Photoelectric Sensors

## Block Photoelectric Sensors






| Housing Size | 20x7.5x10 mm | 8x8x50 mm | **5K** 32x20x11 mm<br>**6K** 32x20x12 mm | 23x44x13 mm<br>42x29x13 mm | 31x55x13 mm<br>31x67x13 mm | 50x43x15 mm |
|---|---|---|---|---|---|---|
| **Series** | **2K** | **Q08M/BMOA** | **5K & 6K** | **15K** | **16K** | **21M** |
| **Housing Material** | Plastic | Metal | Plastic | Plastic | Plastic | Metal |
| **Straight or Right Angle** | Right Angle | Right Angle | Right Angle | Straight or Right Angle | Straight | Right Angle |
| **Thru-beam** | 1.2 m | 1.1 m | **5K** 10 m<br>**6K** 6 m | 5 m | 10 m 30 m | 20 m |
| ⚠ Laser | | | | | | Class I-60 m |
| **Retroreflective** | 3 m | | | | 2.5 m 5 m | |
| **Polarized Retroreflective** | | 550 mm | **5K** 4 m<br>**6K** 2.5 m | 2 m | 1 m, 2 m | 4 m 8 m |
| ⚠ Laser | | | **6K** Class II-1 m | | | Class I-20 m |
| **Diffuse** | 50 mm | 55 mm | **5K** 50 mm to 200 mm, 900 mm<br>**6K** 300 mm | 100 mm, 500 mm | 190 mm, 380 mm | 1 m 2 m |
| ⚠ Laser | | | | | | Class I-600 mm |
| **Wide Angle Diffuse** | | | | | 90 mm 180 mm | |
| **Background Suppression** | 15 mm/30 mm | | **6K**<br>30 mm to 100 mm | | | 20 mm to 200 mm |
| ⚠ Laser | | | **6K** Class II-<br>20 mm to 60 mm<br>30 mm to 110 mm | | | Class I-<br>50 mm to 100 mm |
| **Foreground & Background Suppression** | | | | | | 70 mm to 200 mm |
| **Fixed Focus** | | 10 mm | **6K** 20 mm to 80 mm | 12 mm | 16 mm 43 mm | |
| **Distance Sensor** | | | | | | |
| ⚠ Laser | | | | | | |
| **Luminescence** | | | | | | 40 mm |
| **Contrast Sensor** | | | | | | 19 mm |
| ⚠ Laser | | | **6K** Class II-<br>40 mm to 150 mm | | | |
| **Transparent Detection** | | | **6K** 500 mm | | | 2 m |
| **Fiber Optic** | | | | Yes | Yes | |
| **Supply Voltage** | DC | DC | DC | DC | DC or AC/DC | DC |
| **Web Address:** | **www.balluff.com/photoelectrics** | | | | | |

|  |  |  |  |  |  |
|---|---|---|---|---|---|
| 25K 50x50x18 mm<br>26K 50x50x17 mm | 65x55x20 mm | 55x86x26 mm | 70x90x35 mm | 85x72.5x32 mm | 90x73x30 mm |
| **25K &26K** | **36K** | **45K** | **63M** | **65K** | **66M** |
| Plastic | Plastic | Plastic | Metal | Plastic | Metal |
| Right Angle | Right Angle | Straight | Straight | Right Angle | Right Angle |
| **25K** 20 M | 50 m | 50 m | | 70 m | |
| **25K** 2 m | | | | | |
| **25K** 5 m<br>**26K** 5.5 m | 7 m | 3 m | | 8 m | |
| **26K** Class II-12 m | | | | | |
| **25K** 2 m | 2 m | 2 m | | 2 m | |
| | | | Class II 500 mm to 6 m | | |
| **25K** 50 mm to 250 mm<br>**26K** 30 mm to 300 mm<br>150 mm to 600 mm | 100 mm to 500 mm | | | 200 mm to 1.1 mm | 100 mm to 600 mm |
| **26K** Class II-<br>30 mm to 150 mm<br>50 mm to 300 mm | | | | | Class II-<br>200 mm to 2000 mm |
| | | | | | 100 mm to 600 mm |
| **26K** Class II-45 mm to 85 mm, 30 mm to 100 mm, 80 mm to 300 mm | | | Class II 500 mm to 6 m | | Class II 200 mm to 2000m |
| **25K** 1 m | | | | | |
| DC or AC/DC | DC | DC or AC/DC | DC | DC or AC/DC | DC |

# Specialty Photoelectric Sensors

| Specialty Photoelectric Sensors | Laser | Laser | Distance Measurement (Analog) | Slot/Angle Sensors | Slot/Angle Sensors |
|---|---|---|---|---|---|
| |  |  |  |  |  |
| **Housing Size** | 18 mm Diameter | 30x20x12 mm<br>50x43x15 mm<br>50x50x17 mm<br>70x90x35 mm<br>90x73x30 mm | 18 mm Tubular<br>30x20x12 mm<br>32x20x12 mm<br>50x50x17 mm<br>50x50x25 mm<br>70x90x35 mm<br>90x73x30 mm | 5, 10, 20, 30, 50, 80, 120, 180, 220 mm Gaps | 2 mm Gap |
| **Series** | **18K, 18M, 18MR, 18KF, 18KW** | **6K, 21M, 26K, 63M, 66M** | **BOD 18KF, 6K, 26K, 27K, 63M, 66M** | **BGL** | **BGL 21** |
| **Housing Type** | Threaded Tubular, Combination Threaded Tubular | Block | Tubular or Block | Slot | Advanced Slot |
| **Housing Material** | Plastic or Metal | Plastic or Metal | Plastic | Metal | Metal |
| **Straight or Right Angle** | Straight or Right Angle | Straight or Right Angle | Straight or Right Angle | Slot | Slot |
| **Sensing Modes** | **Thru-Beam**<br>Class I Laser- 50 m, 60 m<br>Class II Laser- 50 m | **Thru-Beam**<br>Class I Laser-60 m | **Retroreflective (Line Measurement Sensor)**<br>0 to 150 mm | **Thru-Beam**<br>Visible Red Emission- 5, 10, 20, 30, 50, 80, 120, 180, 220 mm<br>Class II Laser- 30, 50, 80, 120 mm gaps | **Thru-Beam**<br>Visible Red/Green Emission 2 mm Gap |
| | **Polarized Retroreflective**<br>Class I Laser- 9 m, 12 m, 16 m | **Polarized Retroreflective**<br>Class I Laser- 20 m,<br>Class II Laser- 1 m, 12 m | **Background Suppression**<br>Visible Red Emission<br>20 to 80 mm, Class II Laser- 30 to 100, 80 to 300, 200 to 2000 mm, 500 mm to 6 m | | |
| | **Diffuse**<br>Class I Laser- 250 mm, 350 mm | **Diffuse**<br>Class I Laser- 600 mm | **Distance Sensor (Analog)**<br>20 to 80, 50 to 100, 100 to 600 mm<br>Class II Laser- 45 to 85, 30 to 100, 80 to 300, 200 to 2000 mm, 500 mm to 6 m | | |
| | | **Background Suppression**<br>Class I Laser- 50 to 100 mm,<br>Class II Laser- 20 to 60, 30 to 100, 30 to 110, 30 to 150, 50 to 300, 80 to 300, 200 to 2000 mm, 500 mm to 6 m | | | |
| | | **Distance (Analog)**<br>Class II Laser- 45 to 85, 30 to 100, 80 to 300, 200 to 2000 mm, 500 mm to 6 m | | | |
| | | **Contrast**<br>Class II Laser- 40 to 150 mm | | | |
| **Supply Voltage** | DC | DC | DC, 0-10 V or 4-20 mA | DC | DC |
| **Web Address:** | **www.balluff.com/photoelectrics** | | | | |

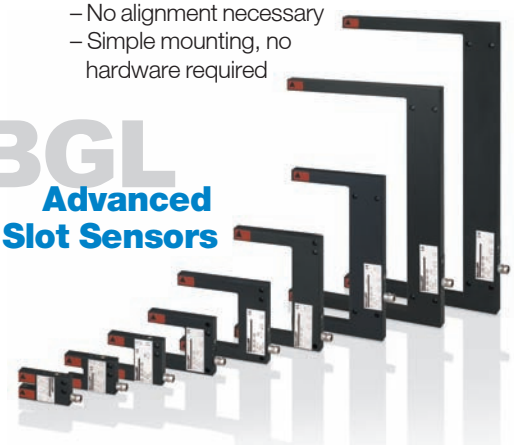
| Slot/Angle Sensors | Fiber Optic (Electric) | Fiber Optic (Electric) | Fiber Optic | Fiber Optic |
|---|---|---|---|---|
|  |  |  |  |  |
| 22 mm/22 mm<br>43 mm/43 mm<br>42 mm/62 mm | 2, 4, 5 mm Smooth<br>Tubular, 3, 5, 6 mm<br>Threaded Tubular<br>12x6x6 mm | 36x52x15 mm | | 18 mm, 50x65x10 mm<br>28x69x13 mm<br>30.7x54.6x13 mm<br>30.7x67.3x13 mm<br>30x60x13 mm<br>30x60x9 mm<br>41x68.5x12 mm |
| **BWL** | **BMOA Electric Fiber Sensing Heads** | **BMOA Electric Fiber Amplifiers** | **BFO Plastic, Glass and Specialty Fiber Optic Cables** | **BOS 18KF, 15K, 16K, 20K, 72K, 73K, 74K** |
| Angle | Tubular and Block | Block | Tubular and Light Screen | Block |
| Metal | Metal | Plastic | Plastic/Metal | Plastic |
| Angle | Tubular Staright, Block Right Angle | Amplifier | Straight or Right Angle | Straight |
| **Thru-Beam**<br>Infrared Emission<br>22 mm/22 mm,<br>43 mm/43 mm,<br>42 mm/62 mm | **Thru-Beam**<br>80 mm, 200 mm,<br>250 mm, 800 mm | | **Thru-Beam**<br>30 mm to 4500 mm depending on Fiber Optic Cable | |
| | **Diffuse**<br>3 mm, 12 mm,<br>15 mm, 63 mm | | **Diffuse**<br>5 mm to 150 mm depending on Fiber Optic Cable | |
| DC | | DC, Analog | | DC or AC/DC |
| **www.balluff.com/photoelectrics** | | | | |

## BKT 6K Class II Laser Contrast Sensor

- 32x20x12 mm miniature body style
- 40 mm to 150 mm sensing distance
- Highly accurate Class II Laser emission
- 0.7 mm spot diameter
- Advanced microprocessor simplifies set-up with a simple push-button or remote teach-in process that automatically learns the target on the fly
- M8 connector or cable out

- Rugged metal housing
- Replaces thru-beam fiber optic cables and amplifier
- No alignment necessary
- Simple mounting, no hardware required

## BGL Advanced Slot Sensors



New laser versions available in 30-120 mm

# Specialty Photoelectric Sensors

## Specialty Photoelectric Sensors

| | Full Color | Full Color | Contrast (Color Mark) | Contrast (Color Mark) | Contrast (Color Mark) |
|---|---|---|---|---|---|
| |  |  |  |  |  |
| **Housing Size** | 50x50x17 mm | 50x50x25 mm | 18 mm Diameter | 32x20x12 mm<br>50x43x15 mm<br>50x50x15 mm<br>83x58x31 mm | 76.9x58x31 mm<br>2 mm Gap |
| **Series** | **BFS 26K** | **BFS 27K** | **BKT 18KF** | **BKT 6K**<br>**BKT 21M**<br>**BKT M** | **BGL 21** |
| **Housing Type** | Block | Block | Combination Threaded Tubular | Block | Advanced Slot |
| **Housing Material** | Plastic | Plastic | Plastic | Plastic | Metal |
| **Straight or Right Angle** | Right Angle | Right Angle | Straight | Straight or Right Angle | Slot |
| **Sensing Modes** | **Retroreflective Full Color**<br>50 mm to 200 mm | **Diffuse Full Color**<br>5 mm to 45 mm | **Diffuse Contrast**<br>Visible White LED<br>10 mm | **Diffuse Contrast**<br>Visible White LED Emission 19 mm<br>Visible Red/Green, Blue/Red, White LED Emission 9, 18, 30, 60 mm<br>Class II Laser- 40 to 150 mm | **Thru-Beam**<br>Visible Red/Green Emission 2 mm Gap |
| | **Diffuse Full Color**<br>12 mm to 32 mm,<br>15 mm to 30 mm,<br>18 mm to 22 mm | | | **Fiber Optic Contrast**<br>3 mm | |
| **Supply Voltage** | DC | DC | DC | DC | DC |
| **Web Address:** | **www.balluff.com/photoelectrics** | | | | |

## New Specialty Photoelectric Sensors

### 63M Analog Distance Sensor

- Small laser spot for detecting small objects over large distances
- Virtually unaffected by the reflective properties of the object within a particular sensing range
- Background suppression (HGA) is adjustable over the entire working range
- Discrete sensing and alarm outputs

### 27K Advanced Full Color Sensor

- 3 channel color sensor with C (Chromaticity) or C+I (Chromaticity and Intensity) functions
- RGB value via RS485 offers millions of color combinations
- Wide spectrum white light LED emission improves color detection
- 3 independent NPN or PNP outputs
- RS485 interface used for:
  - remote set-up
  - teaching color
  - changing tolerance and timer settings
  - chromacity or chromacity and intensity settings

| Luminescence | Luminescence | Transparent Detection | Transparent Detection | Optical Windows | Light Grids |
|---|---|---|---|---|---|
|  |  |  |  |  |  |
| 18 mm Diameter | 50x43x15 mm<br>83x58x31 mm | 18 mm Diameter | 32x20x12 mm<br>50x43x15 mm | 40x80 mm, 80x80 mm, 120x80 mm Dynamic Output Only Windows, 40x40 mm to 400x400 mm Dynamic & Static Output Windows | 100 mm, 150 mm, 300 mm Light Grids |
| **BLT 18KF** | **BLT 21M**<br>**BLT M** | **BOS 18KF** | **BOS 6K**<br>**BOS 21M** | **BOWA Dynamic Output or Dynamic & Static Output** | **BLG Light Grids** |
| Combination Threaded Tubular | Block | Combination Threaded Tubular | Block | Window | Light Grids |
| Plastic<br>Straight | Metal<br>Straight or Right Angle | Plastic<br>Straight or Right Angle | Plastic or Metal<br>Right Angle | Metal<br>Window | Metal<br>Light Grids |
| **Diffuse Luminescence**<br>8 mm to 20 mm | **Diffuse Luminescence**<br>0 to 40 mm, 9 mm, 18 mm, 30 mm, 60 mm | **Retroreflective Transparent**<br>1.7 m | **Retroreflective Transparent**<br>0.5 m, 2 m | **Thru-Beam Dynamic Output Only**<br>40x80 mm, 80x80 mm, 120x80 mm,<br>**Dynamic & Static Output** 40x40 to 400x400 mm | **Thru-Beam Light Grid**<br>150 mm to 850 mm, 800 mm to 2.1 m |
| | **Fiber Optic Luminescence**<br>15 mm | | | | |
| DC | DC | DC | DC | DC | DC |
| **www.balluff.com/photoelectrics** | | | | | |

# BOWA

## Optical Windows

– Three fixed sizes to save you time and money
– Custom sizes available to solve any application
– Detect targets as small as 0.76 mm
– Dynamic outputs detect only moving targets
– Static outputs can detect moving or stationary targets
– Rugged metal housing withstands abuse
– M8 connection for error-free wiring

# BLG

## Dimensional Light Grids

— Sensing distance
  - 150 mm to 850 mm
  - 800 mm to 2.1 m
— Sensing height
  - 100 mm
  - 150 mm
  - 300 mm
— Output
  - 0 to 10 Vdc analog outpu
  - PNP discrete output
— No set-up required