Weld Select Series
Targeted Products and Programs for Welding
Weld Select Series
Weld Select is an industry proven group of Balluff products designed for use in the most inhospitable welding environments.

Poor sensor selection costs welders in every industry increased downtime, unnecessary maintenance, delayed delivery, and lost profits. Now Balluff presents a complete package of welding solutions that extends sensor life and increases productivity in the harshest welding environments.

This guide contains two sections. The front section is designed to help all plant levels identify existing issues and offer Balluff-developed solutions to address them. The second section offers an extensive list of products developed by Balluff welding experts from valuable customer input. These products have been tested in the harshest welding environments and provide significant process and part quality improvement.

Stop Wasting Sensors and destroying connectors
Change the Paradigm of accepted high volume sensor usage
Reduce Downtime due to sensor failure
Slash Consumption of sensors and connectors
Boost Profitability throughout the plant

Pre-Engineered Automation System: Fanuc ArcMate Robot with Lincoln Electric Welding Package, featuring the Balluff zone limit system.

Balluff’s Holistic Approach to Weld Cell Process Improvement
- Expert analysis of all problematic sensor “hotspots” on your plant floor
- Timely and tailored recommendations for weld cell process improvements
- Provide your company with a “roadmap” towards significantly reducing unplanned downtime, greatly reducing material consumption, and increasing profitability
- Train and educate people to make premature sensor failures in welding a thing of the past

www.balluff.com/welding
- New Product News
- Welding Application Reports
- Industry Articles
- Sensor Information
- Case Studies
Non-contact inductive proximity sensors must perform a wide variety of clamping and nesting indication, and Poke-Yoke functions in harsh welding environments. Hot weld slag accumulation, elevated ambient temperatures, and strong electromagnetic fields emitted by weld guns can cause false triggering and degrade sensor performance.

**Welding Environment**

**Electromagnetic Weld Fields**
Strong electromagnetic fields cause conventional sensors to false trigger or “chatter.”

**Solution**
Balluff inductive proximity and magnetic field sensors with weld field immunity (WFI) resist electromagnetic fields emitted by weld guns up to 100 ka/meter.

See pages 14-17

**Weld Slag**
Hot welding slag (a.k.a. weld debris, weld spatter, weld berries) sticks to sensor faces and bodies and causes premature failure to sensors in weld cells.

**Solution**
Balluff SlagMaster® coating on sensor faces resists weld debris and provides a thermal barrier, significantly enhancing sensor longevity, and reducing false triggering. PTFE coated sensor bodies resist weld debris accumulation and promote slag removal during regular scheduled maintenance periods.

See pages 12-17
Incidental sensor damage caused by incorrect parts loading either by human or robotic action can significantly degrade sensor performance, shorten sensor life, or even destroy a sensor. Balluff SteelFace® inductive proximity sensors can withstand multiple heavy impacts and abrasion, and often have the sensing range to be placed out of harm’s way.

Loading Impact

**Problem**

**Damage from Loading Impact**
Severe loading impact and continuous operational impact damages plastic and/or PTFE sensor faces as well as sensor bodies.

**Solution**
Every precaution should be taken to prevent electronics such as sensors from being hit, but in many cases, loading impact cannot always be avoided. By encapsulating a Balluff SteelFace® inductive proximity sensor into a rugged Prox Mount or Bunker Block™, the likelihood of premature failure becomes lessened, even with repeated impact over time.

See pages 18-19, 24-25

**Problem**

**Sensor Faces Damaged by Impact**
Tubular sensors fail a majority of the time from damage to the sensor face caused by slag and impact. Over time, the smallest amounts of damage to the face can cause sensor failure.

**Solution**
Balluff SteelFace® inductive proximity sensors with extended range and solid stainless steel faces and enclosures, resist impact, providing long life in weld cell impact zones. Balluff Bunker Blocks™ and Prox Mounts provide sensors an extraordinary degree of physical protection, preventing contact damage to the sensor body and face as well as rapid sensor removal and replacement without need for recalibration.

See pages 18-19, 24-25
Parts welded in a robotic weld cell must be nested and held in place by pneumatically or hydraulically actuated clamps which are often equipped with sensors located in the clamp jaws to indicate “clamped” or “unclamped” position. Clamp position can also be determined by magnetic field sensors located on the outer wall of an aluminum or composite pneumatic cylinder. To determine clamping position, a Balluff BMF magnetoresistive sensor tracks the magnetic field emitted by a magnet attached to the cylinder’s piston. In high-pressure hydraulic cylinders, Balluff StrokeMaster® end-of-stroke sensors detect the “spud” or cushion of a piston shaft to sense clamp position.

Cylinder & Clamp Position

Cylinders & Clamps Need Stroke Detection
High-pressure hydraulic welding clamps need the right sensors to accurately sense piston extend/retract position and may require electronic weld field immune sensors.

Solution
Balluff StrokeMaster® high pressure rated end-of-stroke sensors accommodate pressures up to 3,000 PSI and fit virtually all common cylinder brands and bore sizes. StrokeMaster heads swivel to direct connector wiring away from weld hostility.

Premature Reed Switch Failure
When installed on pneumatic clamping cylinders, contamination-prone reed switches and drift-prone Hall Effect sensors deteriorate, often providing inaccurate switch points before failing completely.

Solution
Balluff BMF magnetoresistive sensors come with a lifetime warranty and fit virtually all cylinder housing styles and brands. They provide precise switch points and withstand the rigors of the weld process.

See pages 20-21
Photoelectric and fiber optic sensors require special protection and mounting expertise when integrated into welding cells. Balluff has a wide range of photoelectrics with application-specific infrared, red, or laser capability that can reliably sense through smoke, oil and dirt. In addition, Balluff provides a range of accessories that protect photoelectric optics from heat, slag, and lens occlusion in the hostile weld cell environment.

Photoelectric Sensors

**Problem**

**Fiber Optic Limitations**
Fiber optics can become occluded in the weld cell and stop functioning. They can become broken when weld fixtures are removed, causing fibers to vibrate loose. Cables with excess length break when tied back and get damaged by slag.

**Solution**
Typically, fiber optic solutions are not the best choice in weld cells. Metal body laser sensors or inductive proximity sensors are almost always a better choice.

*See pages 22-23*

**Problem**

**Damage by Loading Impact**
Impact-prone photoelectric sensors can easily become physically damaged in welding environments.

**Solution**
The advantages of mounting tubular inductive proximity sensors in Balluff Bunker Blocks™ and Prox Mounts hold true for tubular-style photoelectric sensors. They provide a thermal barrier, protect against weld slag and impact, and provide rapid sensor change out. Bunker Blocks™, available in several sizes and styles, protect block style photoelectric sensors in the weld environment.

*See pages 22-23*
Weld cells demand the toughest connectivity solutions. Hot debris, cable flex, and high ambient heat can damage peripheral devices. PVC jacketed sensor connectors, fine for clean and dry applications, are generally unsuitable for welding environments. Today, PUR (polyurethane) connector jacketing is being replaced with superior high-flex, chemical resistant TPE (thermoplastic elastomer) jacket materials that can better withstand well cell punishment. Now, TPE connectivity components teamed with Balluff Weld Repel® products can result in reduced weld cell material costs and downtime plus increased system longevity and overall profitability.

Protecting Connectivity

Problem
Sensor Cable Burn-Through
Weld slag burns through and destroys conventional cabling. It’s weight often pulls the cable away from the connector, exposing it to even more damage.

Solution
Balluff TPE cables provide the utmost in flex characteristics. In conjunction with Balluff Weld Repel® silicone jacketing, typical problems with connector burn through disappear. When self-bonding Weld Repel wrap is used to attach Weld Repel silicone jacketing to the sensor connector, all gaps allowing debris are eliminated - and it’s transparent for viewing LEDs. Use area protection sheets to protect large areas from debris.

Problem
Plastic Multiport Interface Blocks
Sensor connections often terminate into plastic multiport interface blocks (MIB’s) which can be easily damaged in welding cells.

Solution
Balluff metal MIB’s offer a much greater degree of strength and durability on robust applications like robotic or automated welding cells. All DeviceNet blocks provide strength in the harshest environments. They also have the brightest LEDs in the industry for easier viewing and troubleshooting.

See pages 24-25
Interchangeable weld fixtures and rotating weld tables often require the use of troublesome, expensive, and high maintenance contact-based rotating assemblies such as slip rings or commutator ring and brush solutions. In many cases wires inevitably fray and break. In contrast, Balluff’s unique Power Remote system provides non-contact, wear free wireless connectivity, powering sensors and sending and receiving control information across an air gap. Different systems are available to transmit different levels of power and up to 64 sensors and up to 2 amps.

**Wireless Connectivity**

**Problem**

**Broken or Worn Out Commutator Rings**
Rotational weld cells, or cells that use interchangeable fixtures, often incur high maintenance and frequent stoppages due to damaged slip rings, tangled, over-flexed, or twisted wiring.

**Solution**
Remote sensor systems provide wireless connectivity allowing communication between two or more separated weld cell components through an air gap to energize and communicate between clamping and nesting sensors. Because there is no hard wiring connection, weld fixtures can be inserted into a weld cell frame without the need for mechanical sensor connections, facilitating rapid change out, and improved operator safety.

For more information, visit: [www.balluff.com/remotes](http://www.balluff.com/remotes)
Save time, money, and effort with robot zone limit kits from Balluff. Whether you need 1, 2, or 3-axis rotary, or linear top loaders and RTUs, Balluff’s pre-engineered, fully functional kits are the fastest solution. Our kits are ready to install on popular robot models manufactured by Fanuc, Motoman, and Nachi, and are ready to interface with your safety monitoring circuitry for an easy DLD light curtain muting solution. Mechanical limit switch and inductive non-contact versions are available for both new robotic builds and as a retrofit upgrade for existing robots.

Robot Zone Limit Systems

Problem

Increased Safety within Robotic Weld Cells
Operators working in robot welding installations need to be continuously protected from the equipment during loading and unloading sequences.

Solution

Balluff robot zone limit safety systems are rated for multi-axis movement. They can be set up to work with or without a light curtain, and provide freedom of movement within designated zones. This prevents the robot from entering the zone or stopping the robot if the operator enters the robot’s zone of operation.

For more information, visit:
www.balluff.com/robotzonelimit
Achieve Maximum Performance in Your Welding Process with Balluff Industry Sensor Services

Balluff Industry Sensor Services can go a long way in analysis of your own weld cell productivity, where dramatic decreases in unplanned machine down time can be realized with short ROI payback time intervals. All of this is accomplished through audit training first, then through physical upgrade of your weld cell sensor systems. You say you’re understaffed to do the job right? Balluff Outfitters can upgrade your sensor system point by point to ensure long sensor performance and increase productivity and profitability.

Weld Cell Audit Service
- Expert analysis of all problematic sensor “hotspots” on your plant floor
- Timely and tailored recommendations for weld cell process improvements
- Provide your company with a “roadmap” towards significantly reducing unplanned downtime, greatly reducing material consumption, and increasing profitability

Weld Cell Training Services
- Integrate the welding industry’s Best Practices
- Proactively maintain nesting, clamping, and error proofing sensing devices in the weld cell
- Bunker and protect all sensing system components to ensure the longest possible life of these systems

Balluff Sensor Outfitters
- Does understaffing prevents your company from upgrading your welding cells?
- Team of “hands on” experts come and install the industry’s Best Practices sensor system (sensors, heavy duty bunkers, connectivity, protective jacketing)
- Get your weld cells running with dramatically reduced unplanned machine down time

Examples of common weld cell problems that we’ve solved:

Unprotected and non-bunkered sensors, sensors in damage-prone areas, and/or lightweight brackets.

Damage to unprotected sensor faces and cables caused by impact and contact.

Slag accumulation and unprotected pigtail sensors cause large amounts of downtime.

Bunker Blocks™ and SlagMaster® coating allow full protection against harsh impact.

Weld Repel® Wrap, clear silicone jacketing, and TPE cables provide flexibility and resistance to weld slag, lubricants, and connector burn-through.

PTFE coated Prox-Mounts and Weld Repel® covered sacrificial cables improve sensor life and productivity.
**SlagMaster®**

SlagMaster® coating significantly prolongs sensor life by providing a thermal barrier to protect against heat, retarding build up of weld slag spatter and spray, and easing removal of surrounding deposits of weld debris during scheduled maintenance periods.

The parts listed below are non-weld field immune sensors and do not offer PTFE coating. For PTFE coated weld field immune sensors, see pages 14-17.

For the most up to date parts list, visit: www.balluff.com/slagmaster.

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### Inductive Sensors

**Part Numbers & Specifications**

**SlagMaster® coating**

- Significantly prolongs sensor life by providing a thermal barrier to protect against heat.
- Retards build up of weld slag spatter and spray.
- Eases removal of surrounding deposits of weld debris during scheduled maintenance periods.

### Table: Balluff Part Numbers & Specifications

<table>
<thead>
<tr>
<th>Balluff Part Number</th>
<th>Housing Diameter</th>
<th>Sensing Distance (mm)</th>
<th>Mounting</th>
<th>Output Logic</th>
<th>Housing Material</th>
<th>Drawing</th>
<th>Wiring Diagram</th>
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**High Temperature 120°C, Non-Weld Field Immune**

| BES 516-324-SA55-03 | M8 | 2 | F | PNP, N/O | Stainless steel | 13 | A |
| BES 516-325-SA68-03 | M12 | 2 | F | PNP, N/O | Nickel plated brass | 14 | A |
| BES 516-105-SA9-S4 | M18 | 5 | F | PNPN/Comp | Nickel plated brass | 15 | A |
| BES 516-347-SA13-03 | 25x50x10 | 5 | F | PNP, N/O | GOAlSi12 | 16 | A |

**2-Wire DC, 10..30VDC, Polarized, Normally Open, Non-Weld Field Immune**

| BES M08MG-GSC20B-BP00.3-GS04-101 | M8 | 2 | F | 2-wire | Nickel plated brass | 17 | C |
| BES M12MG-GSC30B-BP00.3-GS04-101 | M12 | 3 | F | 2-wire | Nickel plated brass | 18 | C |
| BES M18MG-GSC70B-BP00.3-GS04-101 | M18 | 7 | F | 2-wire | Nickel plated brass | 19 | C |
| BES M30MF-GSC15B-BP00.3-GS04-101 | M30 | 15 | F | 2-wire | Nickel plated brass | 20 | C |
| BES R01ZC-USC50B-BP00.2-G-S04-101 | 20x23 | 5 | F | 2-wire | GD-Zn | 21 | C |

F = Flush, NF = Non-flush, QF = Quasi-flush

Pigtail sensors available with preinstalled Weld Repel® tubing. Contact factory for availability.

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**Images:**

- [Image 1](#)
- [Image 2](#)
- [Image 3](#)
- [Image 4](#)
- [Image 5](#)
- [Image 6](#)
**Weld Field Immune**

Magnetic field immune (weld-immune) inductive sensors are used for work-piece positioning in welding areas where strong magnetic fields influence ordinary sensors’ oscillator/coil systems. This leads to false switching when no target is present.

Balluff magnetic field immune inductive sensors can be mounted in the direct vicinity of welding tongs or electrodes, since welding currents of up to 25 kA do not affect the switching function of the sensor.

These parts are available with SlagMaster® coating.

<table>
<thead>
<tr>
<th>Balluff Part Number</th>
<th>Housing Diameter</th>
<th>Sensing Distance (mm)</th>
<th>Mounting</th>
<th>Housing Material</th>
<th>SlagMaster® Coated Face</th>
<th>Drawing</th>
<th>Wiring Diagram</th>
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F = Flush, NF = Non-flush, QF = Quasi-flush

Pigtail sensors available with preinstalled Weld Repel® tubing. Contact factory for availability.

*Please specify the cable length for sensors with cable and connector.

00.2, 00.5 = Irradiated PUR, length 0.2 m or 0.5 M
Factor 1

Balluff Factor 1 sensors have special dual coil electronic circuitry whose function is unaffected by strong magnetic fields found in processes such as induction hardening and welding environments. They also come equipped with PTFE coated housings resistant to weld splatter.

Factor 1 sensors sense all metals at the same distance. There is no need to derate the sensing distance based on target material.

These parts are available with SlagMaster® coating.

<table>
<thead>
<tr>
<th>Balluff Part Number</th>
<th>Housing Diameter</th>
<th>Sensing Distance (mm)</th>
<th>Mounting</th>
<th>Output Logic</th>
<th>Housing Material</th>
<th>SlagMaster® Coated Face</th>
<th>Drawing</th>
<th>Wiring Diagram</th>
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Q40 Mounting Guidelines

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Technical Drawings

A: PNP, N/O
B: PNP, Comp

PNP

IN

Watershed

IN

PNP

Pu
**SteelFace®**

Balluff SteelFace® sensors are the go-to sensors for harsh sensing environments. Their one piece gun drilled stainless steel housings stand up to major incidental impacts, their long range characteristics combined with PTFE coatings give them long term survivability in tough weld cell applications, and their price/performance ratio is the best in the market.

<table>
<thead>
<tr>
<th>Balluff Part Number</th>
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<th>Sensing Distance (mm)</th>
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<th>PTFE Coated</th>
<th>Housing Material</th>
<th>Drawing</th>
<th>Wiring Diagram</th>
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**2X Extended Range Product Family (All units 10-30Vdc) (Non-PTFE coated available, remove 01 suffix)**

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**3X Extended Range Product Family (All units 10-30Vdc)**

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<td>BES M30EG1-NSC20Z-S04G-S11</td>
<td>M30</td>
<td>20</td>
<td>QF</td>
<td>NPN, N/O</td>
<td>SS 316</td>
<td>8</td>
<td>B</td>
<td></td>
</tr>
<tr>
<td>BES M30EE1-PSC40F-S04G-S</td>
<td>M30</td>
<td>40</td>
<td>NF</td>
<td>PNP, N/O</td>
<td>SS 316</td>
<td>9</td>
<td>A</td>
<td></td>
</tr>
<tr>
<td>BES M30EE1-NSC40F-S04G-S</td>
<td>M30</td>
<td>40</td>
<td>NF</td>
<td>NPN, N/O</td>
<td>SS 316</td>
<td>9</td>
<td>B</td>
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</tr>
</tbody>
</table>

**Ferrous-only Sensing SteelFace® Product Family (10-30Vdc) (Non-ferrous available)**

<table>
<thead>
<tr>
<th>Balluff Part Number</th>
<th>Housing Diameter</th>
<th>Sensing Distance (mm)</th>
<th>Mounting</th>
<th>Output Logic</th>
<th>PTFE Coated</th>
<th>Housing Material</th>
<th>Drawing</th>
<th>Wiring Diagram</th>
</tr>
</thead>
<tbody>
<tr>
<td>BES M08EG1-PSC15S-S04G-S</td>
<td>M8</td>
<td>1.5</td>
<td>F</td>
<td>PNP, N/O</td>
<td>SS 303</td>
<td>10</td>
<td>A</td>
<td></td>
</tr>
<tr>
<td>BES M08EG1-NSC15S-S04G-S</td>
<td>M8</td>
<td>1.5</td>
<td>F</td>
<td>NPN, N/O</td>
<td>SS 303</td>
<td>10</td>
<td>B</td>
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<tr>
<td>BES M12EG1-PSC20S-S04G-S</td>
<td>M12</td>
<td>2</td>
<td>F</td>
<td>PNP, N/O</td>
<td>SS 303</td>
<td>11</td>
<td>A</td>
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</tr>
<tr>
<td>BES M12EG1-POC20S-S04G-S</td>
<td>M12</td>
<td>2</td>
<td>F</td>
<td>NPN, N/C</td>
<td>SS 303</td>
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<tr>
<td>BES M12EG1-NSC20S-S04G-S</td>
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<td>F</td>
<td>NPN, N/O</td>
<td>SS 303</td>
<td>11</td>
<td>B</td>
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<tr>
<td>BES M18EG1-PSC50S-S04G-S</td>
<td>M18</td>
<td>5</td>
<td>F</td>
<td>PNP, N/O</td>
<td>SS 303</td>
<td>12</td>
<td>A</td>
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<tr>
<td>BES M18EG1-POC50S-S04G-S</td>
<td>M18</td>
<td>5</td>
<td>F</td>
<td>NPN, N/C</td>
<td>SS 303</td>
<td>12</td>
<td>C</td>
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</tr>
<tr>
<td>BES M18EG1-NSC50S-S04G-S</td>
<td>M18</td>
<td>5</td>
<td>F</td>
<td>NPN, N/O</td>
<td>SS 303</td>
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<tr>
<td>BES M30EG1-PSC80S-S04G-S</td>
<td>M30</td>
<td>8</td>
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<td>SS 303</td>
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<td>A</td>
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<tr>
<td>BES M30EG1-NSC80S-S04G-S</td>
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<td>8</td>
<td>F</td>
<td>NPN, N/O</td>
<td>SS 303</td>
<td>13</td>
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</tr>
</tbody>
</table>

**Ferrous-only Sensing SteelFace® Product Family (20-250Vac/300Vdc) (Non-ferrous available)**

<table>
<thead>
<tr>
<th>Balluff Part Number</th>
<th>Housing Diameter</th>
<th>Sensing Distance (mm)</th>
<th>Mounting</th>
<th>Output Logic</th>
<th>PTFE Coated</th>
<th>Housing Material</th>
<th>Drawing</th>
<th>Wiring Diagram</th>
</tr>
</thead>
<tbody>
<tr>
<td>BES M12EN1-USU20S-S21G-S</td>
<td>M12</td>
<td>2</td>
<td>F</td>
<td>AC/DC, N/O</td>
<td>SS 303</td>
<td>14</td>
<td>D</td>
<td></td>
</tr>
<tr>
<td>BES M18EP1-USU50S-S21G-S</td>
<td>M18</td>
<td>5</td>
<td>F</td>
<td>AC/DC, N/O</td>
<td>SS 303</td>
<td>15</td>
<td>D</td>
<td></td>
</tr>
</tbody>
</table>

*F = Flush, NF = Non-flush, QF = Quasi-flush
*Use steel Prox Mounts when Prox Mounts are selected, see page 24
Mounting Guidelines
Each SteelFace® family of sensors has unique mounting requirements. Please contact the factory for additional mounting information.
**Magnetoresistive Sensors**

Ineffective Reed or Hall Effect switches, often provide inaccurate clamped or unclamped position information for pneumatic cylinders used in weld cells. An upgrade to Balluff BMF magnetoresistive sensors will provide more accurate position information over time. BMF sensors are available for virtually every cylinder configuration. They increase machine uptime, lower stocking requirements, and are guaranteed for life.

<table>
<thead>
<tr>
<th>Balluff Part Number</th>
<th>Specialty Mode</th>
<th>Output Logic</th>
<th>Connector Type</th>
<th>Drawing</th>
<th>Wiring Diagram</th>
</tr>
</thead>
<tbody>
<tr>
<td>BMF 305M-PS-C-2-S4*</td>
<td>Metal Body Only</td>
<td>PNP, N/O</td>
<td>M12</td>
<td>1</td>
<td>A</td>
</tr>
<tr>
<td>BMF 305M-PS-C-2-S49*</td>
<td>Metal Body Only</td>
<td>PNP, N/O</td>
<td>M8</td>
<td>2</td>
<td>A</td>
</tr>
<tr>
<td>BMF 305M-PS-C-2-S4A-S49*</td>
<td>Extended Temperature</td>
<td>PNP, N/O</td>
<td>M8</td>
<td>2</td>
<td>A</td>
</tr>
<tr>
<td>BMF 305M-PS-W-2-S4*</td>
<td>WFI</td>
<td>PNP, N/O</td>
<td>M12</td>
<td>1</td>
<td>A</td>
</tr>
<tr>
<td>BMF 315M-PS-W-2-S04-00.3</td>
<td>WFI</td>
<td>PNP, N/O</td>
<td>Pigtail M12</td>
<td>4</td>
<td>A</td>
</tr>
<tr>
<td>BMF 315M-PS-W-2-S49-00.3</td>
<td>WFI</td>
<td>PNP, N/O</td>
<td>Pigtail M8</td>
<td>5</td>
<td>A</td>
</tr>
<tr>
<td>BMF 315M-PS-W-2-PU-05</td>
<td>WFI</td>
<td>PNP, N/O</td>
<td>5 m Cable</td>
<td>6</td>
<td>A</td>
</tr>
<tr>
<td>BMF 315M-PS-D-2-SA3-S49-00.3</td>
<td>Extended Temperature</td>
<td>PNP, N/O</td>
<td>M12</td>
<td>3</td>
<td>A</td>
</tr>
<tr>
<td>BMF 315M-PS-D-2-SA3-PU-05</td>
<td>Extended Temperature</td>
<td>PNP, N/O</td>
<td>M12</td>
<td>3</td>
<td>A</td>
</tr>
<tr>
<td>BMF 32M-PS-W-2-S4*</td>
<td>WFI</td>
<td>PNP, N/O</td>
<td>M12</td>
<td>3</td>
<td>B</td>
</tr>
</tbody>
</table>

* Requires additional bracketry, visit www.balluff.com/bmf

Pigtail sensors available with preinstalled Weld Repel® tubing. Contact factory for availability.

**StrokeMaster®**

Balluff high-pressure cylinder sensors are designed to sense the “spud” or cushion of a high pressure pneumatic or hydraulic cylinder’s piston to indicate clamped or unclamped cylinder gripping jaw positions. Rated to 3000 psi, these embedded inductive, WFI sensors are commonly found in heavy duty welding applications such as automotive and Tier supplier welding environments. StrokeMaster® sensors are available to accommodate many cylinder bore diameters in both AC/DC and in DC formats to meet many welding electrical requirements.

<table>
<thead>
<tr>
<th>Balluff Part Number*,**</th>
<th>Input Voltage</th>
<th>Output Logic</th>
<th>Connector Type</th>
<th>Drawing</th>
<th>Wiring Diagram</th>
</tr>
</thead>
<tbody>
<tr>
<td>BES 516-300-S 295/0.912&quot;...4.560”-S4</td>
<td>10...30 Vdc</td>
<td>PNP, N/O</td>
<td>M12</td>
<td>7</td>
<td>A</td>
</tr>
<tr>
<td>BES 516-200-S 2/0.912&quot;...4.560”-S21</td>
<td>20...250 Vac/Vdc</td>
<td>AC/DC, N/O</td>
<td>1/2&quot; UNF-20-2A</td>
<td>7</td>
<td>C</td>
</tr>
<tr>
<td>BES 516-300-S 2/0.912&quot;...4.560”-S5</td>
<td>20...250 Vac/Vdc</td>
<td>AC/DC, N/O</td>
<td>7/8&quot;-16 UN</td>
<td>7</td>
<td>C</td>
</tr>
</tbody>
</table>

Example: Need probe length of 1.125” combine sensor BES-516-200-S2-1.35-S21 with a 0.225” spacer (1.35” tube length - 0.225” spacer = 1.125” adjusted length). Note: A difference of 0.005” will still have to be carefully considered when sizing a spacer and sensor to the cylinder. - Spacer kits include a spacer, “O” ring, and appropriate mounting screws. - Other spacer kits may be available; consult factory.

To order a spacer kit: Use part number BESA-516-20-KIT-* (X.XXX) measured in inches. (For both DC and AD/DC devices, there is no difference in flange dimensions.)
Power Clamp & Gripper Sensing

Many newer generation power clamp mechanisms integrate a dual inductive proximity sensor “chicklet” configuration joined to a common mounting housing with one common DC micro electrical outlet into their clamp indication system. These inductive proximity sensors sense the passing of steel components passing by the inductive fields to indicate clamped or unclamped jaw position. Balluff power clamp sensors are available to accommodate a wide range of power clamp mechanical configurations and electrical requirements.

<table>
<thead>
<tr>
<th>Input Voltage</th>
<th>Output Logic</th>
<th>Connector Type</th>
<th>Drawing</th>
</tr>
</thead>
<tbody>
<tr>
<td>BES Z02KR2-PSC20F-P*-S04-V</td>
<td>PNP, N/O</td>
<td>M12</td>
<td>8</td>
</tr>
<tr>
<td>BES Z02KR1-PSC20F-P*-S04-V</td>
<td>PNP, N/O</td>
<td>M12</td>
<td>9</td>
</tr>
<tr>
<td>BES Z02KR3-PSC20F-P*-S04-V</td>
<td>PNP, N/O</td>
<td>M12</td>
<td>10</td>
</tr>
</tbody>
</table>

*Lengths Available: P100 = 100 mm, P165 = 165 mm, P200 = 200 mm
Photoelectric Sensors

Photoelectric

When a photoelectric sensor has to be used in a weld cell, it must be protected to survive in this extreme sensing environment. This requires a degree of application expertise. Mechanical protection and bunkering must be applied to achieve acceptable sensor survivability. In addition, ambient weld smoke, weld debris, oil, and mist, as well as sensing distance, excess gain requirements, and precision parameters must be taken into account in the choice of a photoelectric sensor. However, with the appropriate sensor choice, mounting hardware, and connectivity, it is possible to apply a photoelectric in the weld cell environment. Sharpshooter vision sensors offer accurate cost-effective capability in a small package for intra-weld and post weld parts feature validation.

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Sensing Distance</th>
<th>Output</th>
<th>Light Source</th>
<th>Housing Size</th>
<th>Housing/ Lens Material</th>
<th>Bunker Block Available</th>
<th>Drawing</th>
<th>Wiring Diagram</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Metal Body Diffuse and Background Suppression (BGS)</strong> 18 mm Tubular Sensors (Light-on)</td>
<td></td>
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</tr>
<tr>
<td>BOS 18M-PA-LD10-S4</td>
<td>350 mm Diffuse</td>
<td>PNP, Comp</td>
<td>Class 1 Laser</td>
<td>M18</td>
<td>NiPB/PMMA</td>
<td>■</td>
<td>1</td>
<td>B</td>
</tr>
<tr>
<td>BOS 18M-NA-LD10-S4</td>
<td>350 mm Diffuse</td>
<td>NPN, Comp</td>
<td>Class 1 Laser</td>
<td>M18</td>
<td>NiPB/PMMA</td>
<td>■</td>
<td>1</td>
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<tr>
<td>BOS 18M-PSV-LH22-S4</td>
<td>150 mm BGS</td>
<td>PNP, N/O</td>
<td>Class 1 Laser</td>
<td>M18</td>
<td>NiPB/PMMA</td>
<td>■</td>
<td>5</td>
<td>D</td>
</tr>
<tr>
<td>BOS 18M-PA-1HA-S4-C</td>
<td>40...120 mm BGS</td>
<td>PNP, Comp</td>
<td>Visible Red</td>
<td>M18</td>
<td>NiPB/PMMA</td>
<td>■</td>
<td>2</td>
<td>B</td>
</tr>
<tr>
<td>BOS 18M-PS-1HA-E5-C-S4</td>
<td>10...120 mm BGS</td>
<td>PNP, N/O</td>
<td>Visible Red</td>
<td>M18</td>
<td>NiPB/PMMA</td>
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<td>A</td>
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<tr>
<td><strong>Extreme IP69K Diffuse 18 m Tubular Sensors (Light-on)</strong></td>
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</tr>
<tr>
<td>BOS 18E-PS-1YA-E5-D-S4</td>
<td>100 mm Diffuse</td>
<td>NPN, N/O</td>
<td>Visible Red</td>
<td>M18</td>
<td>Stainless Steel/Glass</td>
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<td>4</td>
<td>A</td>
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<tr>
<td>BOS 18E-PS-1YB-E5-D-S4</td>
<td>200 mm Diffuse</td>
<td>NPN, N/O</td>
<td>Visible Red</td>
<td>M18</td>
<td>Stainless Steel/Glass</td>
<td>■</td>
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<td>A</td>
</tr>
<tr>
<td>BOS 18E-PS-1YD-E5-D-S4</td>
<td>400 mm Diffuse</td>
<td>NPN, N/O</td>
<td>Visible Red</td>
<td>M18</td>
<td>Stainless Steel/Glass</td>
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<td>4</td>
<td>A</td>
</tr>
<tr>
<td><strong>Background Suppression Block Style Sensors (Light-on)</strong></td>
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<tr>
<td>BOS 26K-PA-1LHC-S4-C</td>
<td>50...300 mm BGS</td>
<td>PNP, Comp</td>
<td>Class II Laser</td>
<td>50X17X50</td>
<td>ABS/PMMA</td>
<td>■</td>
<td>6</td>
<td>B</td>
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<tr>
<td>BOS 26K-NA-1LHC-S4-C</td>
<td>50...300 mm BGS</td>
<td>NPN, Comp</td>
<td>Class II Laser</td>
<td>50X17X50</td>
<td>ABS/PMMA</td>
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<td>C</td>
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<tr>
<td>BOS 26K-PA-1LHB-S4-C</td>
<td>30...150 mm BGS</td>
<td>PNP, Comp</td>
<td>Class II Laser</td>
<td>50X17X50</td>
<td>ABS/PMMA</td>
<td>■</td>
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<td>B</td>
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<tr>
<td>BOS 26K-NA-1LHB-S4-C</td>
<td>30...150 mm BGS</td>
<td>NPN, Comp</td>
<td>Class II Laser</td>
<td>50X17X50</td>
<td>ABS/PMMA</td>
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<td>C</td>
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<tr>
<td><strong>Analog Block Style Sensors with BGS Switching (Light-on)</strong></td>
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<tr>
<td>BOD 63M-LA01-S115*</td>
<td>500...6000 mm BGS</td>
<td>0-10 V, PNP</td>
<td>Class II Laser</td>
<td>70X35X90</td>
<td>Anodized AL/Glass</td>
<td>■</td>
<td>7</td>
<td>E</td>
</tr>
<tr>
<td>BOD 63M-LB01-S115*</td>
<td>500...6000 mm BGS</td>
<td>4-20 mA, PNP</td>
<td>Class II Laser</td>
<td>70X35X90</td>
<td>Anodized AL/Glass</td>
<td>■</td>
<td>7</td>
<td>E</td>
</tr>
<tr>
<td>BOD 66M-RA01-S92-C**</td>
<td>100...600 mm BGS</td>
<td>0-10 V, PNP</td>
<td>Visible Red/ Class II Laser</td>
<td>100.5X30X73.2</td>
<td>GD-Zn/Glass</td>
<td>■</td>
<td>8</td>
<td>F</td>
</tr>
<tr>
<td>BOD 66M-RB01-S92-C**</td>
<td>100...600 mm BGS</td>
<td>4-20 mA, PNP</td>
<td>Visible Red/ Class II Laser</td>
<td>100.5X30X73.2</td>
<td>GD-Zn/Glass</td>
<td>■</td>
<td>8</td>
<td>F</td>
</tr>
<tr>
<td>BOD 66M-LA04-S92-C**</td>
<td>200...2000 mm BGS</td>
<td>0-10 V, PNP</td>
<td>Visible Red/ Class II Laser</td>
<td>100.5X30X73.2</td>
<td>GD-Zn/Glass</td>
<td>■</td>
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<td>F</td>
</tr>
<tr>
<td>BOD 66M-LB04-S92-C**</td>
<td>200...2000 mm BGS</td>
<td>4-20 mA, PNP</td>
<td>Visible Red/ Class II Laser</td>
<td>100.5X30X73.2</td>
<td>GD-Zn/Glass</td>
<td>■</td>
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<td>F</td>
</tr>
<tr>
<td><strong>Sharpshooter® Machine Vision Sensors</strong></td>
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<tr>
<td>BVS OI-3-001-E</td>
<td>460X380 mm</td>
<td>3x, PNP</td>
<td>Front Illumination Red LED</td>
<td>40X52X70</td>
<td>Painted Al/PMMA</td>
<td>9</td>
<td>G</td>
<td></td>
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<tr>
<td>BVS OI-3-002-E</td>
<td>460X380 mm</td>
<td>3x, NPN</td>
<td>Front Illumination Red LED</td>
<td>40X52X70</td>
<td>Painted Al/PMMA</td>
<td>9</td>
<td>G</td>
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<tr>
<td>BVS OI-3-003-E</td>
<td>320X210 mm</td>
<td>3x, PNP</td>
<td>Front Illumination Red LED</td>
<td>40X52X70</td>
<td>Painted Al/PMMA</td>
<td>9</td>
<td>G</td>
<td></td>
</tr>
<tr>
<td>BVS OI-3-004-E</td>
<td>320X210 mm</td>
<td>3x, NPN</td>
<td>Front Illumination Red LED</td>
<td>40X52X70</td>
<td>Painted Al/PMMA</td>
<td>9</td>
<td>G</td>
<td></td>
</tr>
<tr>
<td><strong>Accessories</strong></td>
<td></td>
<td></td>
<td>Front Illumination Red LED</td>
<td>40X52X70</td>
<td>Painted Al/PMMA</td>
<td>9</td>
<td>G</td>
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</tr>
<tr>
<td>BOS 26-HW-7</td>
<td></td>
<td></td>
<td>Bunker Block™</td>
<td>26K Block Style</td>
<td>Aluminum</td>
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<tr>
<td>BES 24-KB-9L &amp; BES 18.0-KH-2L/W</td>
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<td></td>
<td>Bunker Block™</td>
<td>18M Tubular Style</td>
<td>Aluminum</td>
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<tr>
<td>BES 18.0-KB-10/W</td>
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<td>Bunker Block™ II</td>
<td>18M Tubular Style</td>
<td>Copper Plated Steel</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BOD 66-SH-4</td>
<td>Lens</td>
<td></td>
<td>PTFE lens cover for BOD 63 &amp; 66M</td>
<td>Aluminum/PTFE</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BOD 66-SH-5</td>
<td>Lens</td>
<td></td>
<td>PTFE slotted lens cover for BOD 63 &amp; 66M</td>
<td>Aluminum/PTFE</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* Use cable C04 ANT-00-PB-050MS ** Use cable C04 ANQ-00-VB-050MS
Accessories

Balluff’s Weld Repel® sensor protection solution provides total protection not only for the sensor, but for the connector and cable as well. This complete protection package will yield the weld cell a significant increase in productivity because the sensor and its associated connectivity will last far longer than a similar unprotected or poorly protected sensor and cable. The same excellent protection is found in area protection sheets for draping large surfaces. Protecting valve banks, large collections of cables, air lines, weld pedestals, and robots becomes easy with silicone area protection sheets.

The Balluff Bunker Block™ with a quick-change Prox Mount protects the sensor body and face from abusive physical damage. Since the Bunker Block™ is made of machined aluminum and the Prox Mount is PTFE-coated, the entire system repels weld slag buildup. The copper clad, all steel Bunker Block® II offers excellent loading impact and compliments Balluff 2X SteelFace sensors in the toughest welding applications. The SlagMaster® coating on the face of the proximity sensor can also repel weld slag accumulation and protect the sensor face from damage even in severe welding environments. To connect the sensor, start with a TPE cable which has high durability, and then cover the cable with the Weld Repel® system. This system uses a medical grade silicone jacket to protect the cable and a silicone wrap to secure the jacket in its proper location while sealing remaining connectivity components against harsh, hot weld spray. Pre-installed Weld Repel® jacketing over select TPE cables are available. Please consult factory for additional information.

TPE Cables

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>C04 AEL-00-TY-050M</td>
<td>M12 Straight female, 4-wire, 5 m</td>
</tr>
<tr>
<td>C04 BEL-00-TY-050M</td>
<td>M12 Right angle female, 4-wire, 5 m</td>
</tr>
<tr>
<td>C04 AEH-00-TY-050M</td>
<td>M12 Straight female, 3-wire, PNP LED, 5 m</td>
</tr>
<tr>
<td>C04 BEH-00-TY-050M</td>
<td>M12 Right angle female, 3-wire, PNP LED, 5 m</td>
</tr>
<tr>
<td>C49 ANE-00-TY-050M-2</td>
<td>M8 Straight female, 3-wire, 5 m</td>
</tr>
<tr>
<td>C49 BNE-00-TY-050M-2</td>
<td>M8 Right angle female, 3-wire, 5 m</td>
</tr>
<tr>
<td>C21 AE3-00-TY-150F</td>
<td>1/2” X 20 UNF Straight female, 3-pin dual keyway, 15 ft</td>
</tr>
<tr>
<td>C21 BE3-00-TY-150F</td>
<td>1/2” X 20 UNF Right angle female, 3-pin dual keyway, 15 ft</td>
</tr>
</tbody>
</table>

Other cables available, consult factory for more information.

Prox Mounts

<table>
<thead>
<tr>
<th>PTFE (White) Coated Brass Short Proxes (≥30mm)</th>
<th>PTFE (White) Coated Brass Long Proxes (≥40mm)</th>
<th>PTFE (Black) Coated Steel Proxes (≥30mm)</th>
<th>Outer Diameter</th>
<th>Inner Diameter</th>
</tr>
</thead>
<tbody>
<tr>
<td>BES 08.0-KH-2S/W</td>
<td>BES 08.0-KH-2L/W</td>
<td>BES 08.0-KH-11S/W</td>
<td>M12x1</td>
<td>8 mm</td>
</tr>
<tr>
<td>BES 12.0-KH-2S/W</td>
<td>BES 12.0-KH-2L/W</td>
<td>BES 12.0-KH-11S/W</td>
<td>M16x1</td>
<td>12 mm</td>
</tr>
<tr>
<td>BES 18.0-KH-2S/W</td>
<td>BES 18.0-KH-2L/W</td>
<td>BES 18.0-KH-11S/W</td>
<td>M18x1</td>
<td>12 mm</td>
</tr>
<tr>
<td>BES 30.0-KH-2S/W</td>
<td>BES 30.0-KH-2L/W</td>
<td>BES 18.0-KH-11S/W-M18</td>
<td>M24x1.5</td>
<td>18 mm</td>
</tr>
<tr>
<td>BES 30.0-KH-2S/W</td>
<td>BES 30.0-KH-2L/W</td>
<td>BES 18.0-KH-11S/W</td>
<td>M36x1.5</td>
<td>30 mm</td>
</tr>
<tr>
<td>BES 30.0-KH-2S/W-M18</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The Weld Select Series from Balluff is the ultimate solution for increasing productivity and decreasing sensor failure.
**Weld Repel® Wrap**

- **BKS PW-26/20-SI-TR-03.5**: 1" wide x 12 ft Clear silicone wrap
- **BKS PW-51/30-SI-TR-11**: 2" wide x 36 ft Clear silicone wrap

**SlagMaster® recommended. See pages 12-17.**

**Weld Repel® Area Protection**

- **BKS S-PS-914/16-SI**: 3 ft x custom length in ft
- **BKS S-PS-914/16-SI-00.91**: 3 ft x 3 ft sheet

**Weld Repel® Jacket**

- **BKS-PT-7/16-SI-15**: Clear silicone tubing, 1/4" dia. x 50 ft (15 m)
- **BKS-PT-10/16-SI-15**: Clear silicone tubing, 3/8" dia. x 50 ft (15 m)†
- **BKS-PT-13/16-SI-15**: Clear silicone tubing, 1/2" dia. x 50 ft (15 m)††, *
- **BKS-PT-16/16-SI-15**: Clear silicone tubing, 5/8" dia. x 50 ft (15 m)‡‡, *
- **BKS-PT-19/16-SI-15**: Clear silicone tubing, 3/4" dia. x 50 ft (15 m)
- **BKS-PT-38/16-SI-07.5**: Clear silicone tubing, 1/5" dia. x 25 ft (15 m)
- **BKS-PT-50/16-SI-07.5**: Clear silicone tubing, 2" dia. x 25 ft (15 m)

* Recommended for use with M12 (micro) single ended cables
** Recommended for use with M12 (micro) double ended cables
† Recommended for use with M8 (nano) single ended cables
†† Recommended for use with M8 (nano) single ended cables

**Bunker Block®**

<table>
<thead>
<tr>
<th>Machined AL</th>
<th>Prox Mount Required</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>BES 12.0-KB-9L</td>
<td>BES 08.0-KH-2L/W</td>
<td>M8 sensors (40 mm+)</td>
</tr>
<tr>
<td>BES 16.0-KB-9L</td>
<td>BES 12.0-KH-2L/W</td>
<td>M12 sensors (40 mm+)</td>
</tr>
<tr>
<td>BES 24.0-KB-9L</td>
<td>BES 18.0-KH-2L/W</td>
<td>M18 sensors (40 mm+)</td>
</tr>
<tr>
<td>BES 36.0-KB-9L</td>
<td>BES 30.0-KH-2L/W</td>
<td>M30 sensors (40 mm+)</td>
</tr>
<tr>
<td>BES 12.0-KB-9S</td>
<td>BES 08.0-KH-2S/W</td>
<td>M8 sensors (short)</td>
</tr>
<tr>
<td>BES 16.0-KB-9S</td>
<td>BES 12.0-KH-2S/W</td>
<td>M12 sensors (short)</td>
</tr>
<tr>
<td>BES 24.0-KB-9S</td>
<td>BES 18.0-KH-2S/W</td>
<td>M18 sensors (short)</td>
</tr>
<tr>
<td>BES 36.0-KB-9S</td>
<td>BES 30.0-KH-2S/W</td>
<td>M30 sensors (short)</td>
</tr>
</tbody>
</table>

**Bunker Block® II without positive stop**

<table>
<thead>
<tr>
<th>Copper Plated Steel</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>BES 08.0-KB-10/W</td>
<td>M8 sensors</td>
</tr>
<tr>
<td>BES 12.0-KB-10/W</td>
<td>M12 sensors</td>
</tr>
<tr>
<td>BES 18.0-KB-10/W</td>
<td>M18 sensors</td>
</tr>
<tr>
<td>BES 30.0-KB-10/W</td>
<td>M30 sensors</td>
</tr>
</tbody>
</table>
Additional Accessories

Balluff offers many accessories designed to survive in the welding environment. These offerings are very effective at protecting and increasing sensor and connectivity life. Covers, caps, plungers, and clamps are all designed to help protect the sensor from damage. Metal connectivity accessories allow for heavy duty applications in the harshest environments, while Weld Jacket is another option in the fight to protect cables from damage. All of the products listed below will help reduce sensor failure and increase sensor life expectancy.

### Accessories

#### Part Numbers & Specifications

**Aluminum Clamp with Positive Stop**

- **BES 08.0-KB-4-F**: AL clamp for M8 sensors
- **BES 12.0-KB-4-F**: AL clamp for M12 sensors
- **BES 18.0-KB-4-F**: AL clamp for M18 sensors
- **BES 30.0-KB-4-F**: AL clamp for M30 sensors

**Q40 & 26K Sensor Accessories**

- **BES Q40-HW-2**: Metal mounting bracket
- **BES Q40-SH-1**: AL protection cover
- **BES Q40-SH-2**: PA6 protection cover
- **BES 26-HW-7**: BOS 26K Bunker Block

**Protective Caps**

- **BES 12-CERAMIC-CAP-1**: Ceramic for M12 sensors
- **BES 18-CERAMIC-CAP-1**: Ceramic for M18 sensors
- **BES 30-CERAMIC-CAP-1**: Ceramic for M30 sensors
- **BES _ _ -SM-4**: PTFE caps for Prox Mounts (12, 16, 24, 36)

**Air Blow-off Accessories & Air Knife**

- **BOS 12-LT-1**: Air blow-off for M12 sensors
- **BOS 18-LT-1**: Air blow-off for M18 sensors
- **BMS CZ M-D-18-1001**: Air knife

**Heavy Duty Prox Actuator Plunger**

- **BES JPH-0.625-12-1.50**: Prox plunger for M12 sensors

**R01 Flatpack Sensor Accessories**

- **BES R01-SH-4-A**: Over-the-top, retro-fit bunker block
- **BES R01-SH-4-B**: Socket style bunker block (for new installations)
- **BES R01ZC-TC**: PTFE protective cover

**WELD Jacket**

- **WELD-JACKET-1/2”**: Silicone & fiberglass 1/2” diameter (by the foot)
- **WELD-JACKET-3/4”**: Silicone & fiberglass 3/4” diameter (by the foot)
Networking and Passive Connectivity

The Balluff line of welding products now includes a family of passive and active multiple interface blocks and modules, which allows the end-user to consolidate multiple I/O points to one location. Typically, these products are plastic and non-potted, but Balluff's blocks and modules are IP67, fully potted and metal housed, allowing them to survive in the toughest environments. The active modules communicate on DeviceNet and Profibus and for ease of troubleshooting they contain the largest and most visible LEDs in the industry and provide all the needed diagnostic data demanded in today's industries. Balluff's Networking and Passive connectivity products complete the total welding solution from the sensor to the controls cabinet.

<table>
<thead>
<tr>
<th>DeviceNet Modules</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>BNI DNT-104-00-Z004</td>
<td>16 input only</td>
</tr>
<tr>
<td>BNI DNT-202-00-Z005</td>
<td>8 output only</td>
</tr>
<tr>
<td>BNI DNT-302-00-Z005</td>
<td>16 configurable</td>
</tr>
<tr>
<td>BNI DNT-305-00-Z005</td>
<td>8 in/8 out</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Profibus Modules</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>BNI PBS-104-000-Z004</td>
<td>16 input only</td>
</tr>
<tr>
<td>BNI PBS-302-000-Z001</td>
<td>16 configurable</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Metal Multiple Interface Blocks (with PNP LEDs)</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>BSB-04-F01P/4-M02M-KP-**</td>
<td>4 port MIB, out</td>
</tr>
<tr>
<td>BSB-04-F01P/4-M01M-2319</td>
<td>4 port MIB, QD homerun cable</td>
</tr>
<tr>
<td>BSB-04-F01P/8-M02M-KP-**</td>
<td>8 port MIB, cable out</td>
</tr>
<tr>
<td>BSB-04-F01P/8-M01M-2319</td>
<td>8 port MIB, QD homerun cable</td>
</tr>
<tr>
<td>CM 23_, N8-00-PB-100M</td>
<td>QD homerun cable, 10 m</td>
</tr>
</tbody>
</table>

* 05 (5 m cable) or 10 (10 m cable)
_ = A (straight) or B (90°)

A full line of networking and auxiliary power cables are available. Visit www.balluff.com or consult factory for more details.

Stop Wasting Sensors and select your sensor based on application
Change the Paradigm and use sensor and cable protection systems
Reduce Downtime by installing SlagMaster® and SteelFace® sensors
Slash Consumption by protecting with Weld Repel® Jacket and Wrap
Boost Profitability through extending sensor life