

Inductive Proximity Switches — Category Analysis

Source: [baumer.com](#) › Product overview › Object detection › Inductive proximity switches (category 278, IN/EN site)
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1. What the category covers

Inductive proximity switches detect **metallic objects without contact**. An oscillator drives a coil that radiates a high-frequency field from the sensing face; a metal target entering that field induces eddy currents, damping the oscillation. The evaluation circuit converts this into a switching signal. No mechanical wear, no target marking required, and immunity to dust, oil, water and vibration.

Position in Baumer's structure: "Inductive proximity switches" sits under *Object detection*, alongside photoelectric sensors, ultrasonic sensors and capacitive sensors. It is the largest sub-category by article count and is filtered on the site by housing style, sensing distance, output function, connection type and approvals.

2. Product families on the page

Family / variant	Purpose & distinguishing feature
Standard inductive sensors	General-purpose detection; the volume range. Cylindrical threaded barrels and rectangular blocks, flush (shielded) and non-flush (unshielded).
Extended sensing range	Roughly 1.5–2× the standard distance in the same housing — more installation tolerance, fewer collisions.
Factor 1 (all-metal)	Identical switching distance for steel, stainless, aluminium, brass, copper. Removes reduction-factor calculations on mixed-material lines.
Weld-field immune	Resistant to strong magnetic fields and weld spatter; PTFE/ceramic-coated faces. For resistance-welding cells in automotive body shops.
High-pressure	Screw directly into hydraulic cylinders / valve blocks; pressure-rated stainless front. Piston-position sensing.
High-temperature	Extended ambient range for ovens, foundries, drying tunnels.
Hygienic / stainless steel	V4A (1.4404) one-piece bodies, washdown-capable, food & pharma environments.
Analogue / distance-measuring	Continuous output instead of a switch point — for gap, runout and position measurement.
Ring & slot sensors	Detect small parts, screws or wire passing through an aperture.
IO-Link versions	Digital point-to-point link: remote parameterisation, diagnostics, device replacement without re-teaching.
Ex / ATEX versions	NAMUR or intrinsically safe types for hazardous areas.

3. Typical technical envelope

Housings

- Cylindrical: Ø3 / Ø4 / Ø6.5 mm smooth
- Threaded: M5, M8, M12, M18, M30
- Rectangular / cubic blocks
- Ring and slot geometries
- Brass nickel-plated or stainless steel

Electrical

- Supply: typically 10–30 V DC
- Output: PNP or NPN, NO / NC / antivalent
- 2-wire, 3-wire, 4-wire; NAMUR; IO-Link
- Short-circuit, reverse-polarity, overload protection

Environment

- Protection: IP67 → IP68 / IP69K
- Ambient: approx. –25...+75 °C standard; high-temp variants above
- Shock & vibration rated per IEC 60947-5-2

Connection

- M8 or M12 connector
- Fixed cable (PVC / PUR)
- Pigtail (cable + connector)

Approvals

- CE / UKCA, cULus, RoHS
- ATEX / IECEx on Ex range

4. Indicative sensing distances (standard types)

Housing	Flush (shielded)	Non-flush (unshielded)	Extended range
M5	0.8 mm	1.5 mm	–
M8	1.5 mm	2.5 mm	2 – 4 mm
M12	2 mm	4 mm	4 – 8 mm
M18	5 mm	8 mm	8 – 12 mm
M30	10 mm	15 mm	15 – 22 mm

Values are nominal (S_n) for a standard mild-steel target. Non-Factor-1 sensors require reduction factors: stainless $\approx$ 0.7–0.8, brass $\approx$ 0.4–0.5, aluminium $\approx$ 0.35–0.4, copper $\approx$ 0.25–0.35.

5. How to select from this category

Decision	What drives it
Housing size & shape	Available mounting space; M12/M18 are the volume standards, M5/Ø4 for grippers and tooling.
Flush vs. non-flush	Flush can be embedded level with metal; non-flush needs a clear zone but gives longer range.
Sensing distance	Target the working air gap at ~70–80 % of S_n to absorb temperature drift and mechanical tolerance.
Target material	Non-ferrous or mixed materials → choose Factor 1.
Output & wiring	Match PLC input card (PNP is the norm in IEC systems); IO-Link if diagnostics/recipe changes are wanted.
Environment	Welding → weld-immune; washdown → stainless IP69K; hydraulics → high-pressure; hazardous area → Ex.
Connection	Connector for fast replacement; cable for tight or moving installations.

6. Typical applications

- **Factory automation:** end-of-travel, cylinder position, part-present checks, indexing tables, jig confirmation.
- **Automotive:** body-in-white welding cells, clamp and pin position, conveyor pallet detection.
- **Packaging & food:** cam/shaft position, guard-door status, washdown lines (stainless variants).
- **Machine tools:** tool-changer position, chuck open/closed, coolant-resistant mounting.
- **Mobile hydraulics:** piston position inside cylinders (high-pressure types).
- **Speed / counting:** gear-tooth and sprocket pulse pickup.

7. Commercial & site observations

- The category page is a **filterable product finder** rather than a static list — results narrow by housing, sensing distance, output, connection, temperature and approval.
- Each article links to a datasheet (PDF), CAD/STEP model, EPLAN macro and, for IO-Link devices, an IODD file.
- The IN/EN locale routes enquiries to Baumer's India organisation; pricing and stock are generally quotation-based rather than published.
- Competitive positioning: Baumer emphasises miniature formats, Factor 1 performance and weld-field immunity against Pepperl+Fuchs, ifm, Balluff, SICK, Turck and Omron.

8. Summary assessment

A broad, well-segmented range covering the full spectrum from Ø3 mm miniature sensors to high-pressure and Ex-rated devices. **Strengths:** depth of specialised variants, strong digital engineering data (CAD/EPLAN/IODD), IO-Link coverage. **Watch-points for the buyer:** reduction factors on non-ferrous targets unless Factor 1 is specified; confirm temperature and IP rating against the actual washdown or weld regime; verify lead times for specialised variants in the Indian market.

Verification note: Family names, sensing distances and specification ranges in this document are indicative of the product class and must be confirmed against the current Baumer catalogue and individual article datasheets before specification or purchase.