

871TM Extended Range Inductive Proximity Sensors User Manual



SUMMARY

The Extended Range 871TM all stainless steel family of inductive proximity sensors offers sensing ranges 2x-3x those of standard inductive models. In addition to providing equal sensing distance for mild steel and aluminum, the 871TM Extended Range also senses other metals at ranges greater than standard technologies. Although extended sensing range technology allows for improved performance, certain additional installation/application considerations must be taken into account.

TARGET

CONSIDERATIONS

Material:

Unlike standard proximity sensors which offer considerably less sensing distance for nonferrous metals, Extended Range 871TM proximity sensors detect such materials at distances almost equal to that of steel. See the correction factor chart below for the most common target materials:

Correction Factors:

Note: Correction factor data based on standard target sizes (IEC 60947-5-2 / 8.3.2.1.1)

| Barrel Diameter | Steel FE 360 | Copper | Aluminum | Brass | Stainless Steel 1mm Thick | Stainless Steel 2mm Thick |
|-----------------|--------------|--------|----------|-------|------------------------------|------------------------------|
| Shielded M12 | 1.0 | 0.85 | 1.0 | 1.3 | 0.45 | 0.9 |
| Unshielded M12 | 1.0 | 0.8 | 1.0 | 1.3 | 0.5 | 0.9 |
| Shielded M18 | 1.0 | 0.85 | 1.0 | 1.3 | 0.4 | 0.8 |
| Unshielded M18 | 1.0 | 0.85 | 1.0 | 1.3 | 0.1 | 0.8 |
| Shielded M30 | 1.0 | 0.9 | 1.0 | 1.2 | 0.5 | 0.9 |
| Unshielded M30 | 1.0 | 0.85 | 1.0 | 1.2 | no detection | 0.5 |

Note: Stainless Steel targets are the exception; sensing distances for stainless steel are dependent on target size, thickness and grade.

Target Thickness:

The sensing behavior of conventional inductive proximity sensors is only slightly influenced by the thickness of the target, foils being the one exception. Generally aluminum foil will produce a higher sensing range than thicker metals. 871TM Extended Range units however, behave differently. The sensing distance for metals over approximately 1mm thick remains constant for most materials (stainless steel excluded) used in machine construction. However, for targets less than 1mm thick the sensing range decreases and foils, in general, cannot be detected.

MOUNTING

CONSIDERATIONS Mounting considerations for shielded 871TM Extended Range units are essentially identical to those of any inductive proximity sensor. The unshielded models, however, require special mounting considerations as a result of their response to nonferrous metals. Due to the unusually long sensing ranges of the 871TM Extended Range, the sensing field extends farther back on the barrel and has a wider diameter than typical devices. This increased field requires any metal mounting hardware be placed as far back on the sensor barrel as possible to avoid interference and false triggering. When selecting mounting hardware the recommended bracket materials are stainless steel or plastic—especially in the case of the 30mm units. For assistance determining the best mounting hardware for your application, consult your Rockwell Automation representative.

MAGNETIC FIELDS All inductive proximity switches are affected by external alternating magnetic fields whose frequencies lie close to the sensor's operating frequency. Unlike standard inductive proximity sensors whose operating frequencies lie in the region of a few 100kHz, the 871TM Extended Range family operates in the area of a few kHz. In particular, 50Hz magnetic fields with high harmonic content, such as stray fields from mains transformers as well as nearby stepping motors, can lead to problems with the 871TM Extended Range. However, the potential for these sensors to be influenced by switching power supplies (induction heaters, for example) is significantly lower.

Permanent magnetic fields and low frequency alternating fields (50/60 Hz) with low harmonics content are permissible up to a field strength of 1,000A/m (30mm barrel diameter—80 A/m).

LIQUIDS

Due to their one-piece stainless-steel construction, the 871TM Extended Range family of inductive proximity sensors is naturally suitable for applications where liquids are present. Cable units are virtually impermeable from a construction standpoint; however, the PUR cable used can have limitations when faced with various chemicals. The same is true for micro QD models in most cases, however, some manufacturers' cordsets may have a missing or unsuitably dimensioned O-ring on the connector side causing an unstable seal. For this reason, cable models are strongly recommended in applications where sealing is crucial. To determine the best cabling option for your application, consult your local Rockwell Automation representative.

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