

INDUCTIVE PROXIMITY SENSOR INFLUENCES

When applying inductive proximity sensors, it is important to understand the sensing range and the factors that influence that range. **The sensing range refers to the distance between the sensor face and the target.** It also includes the shape of the sensing field generated through the coil/core.

There are four main concerns when selecting and applying proximity sensors:

- Target Considerations: Material, Size, Shape and Approach
- Coil Size and Shielding
- Sensor Mounting Requirements
- Environment

Target Type

You need to know the target's material and size. This information will help you determine the maximum sensing distance. Exceed this distance, and the damping effect necessary to trip the sensor's output will not be created — and the sensor will fail to sense the target.

Proximity sensors work best with ferrous metals. Though these sensors detect other metals, the range will not be as great. Generally, the less iron in the target, the closer the target has to be to the sensor to be detected.

Manufacturers generally provide charts showing the necessary correction factors for various types of metals when applying their sensors. Each sensor style will have a correction factor to enable calculation for a particular target material.

Target Size

The size of the target also matters. If you run a target smaller than the sensor's "standard size," sensing range will decrease. This is because a smaller target creates a weaker eddy current. However, a bigger target does not mean a longer sensing range.

The thickness of the target does not impact sensing range much. However, a very thin non-ferrous target can actually achieve a greater sensing range because it generates an eddy current on both sides (known as the foil effect).

So, how big should the target be? **The rule of thumb is: the size of the sensor's diameter, or three times the sensor's sensing range, whichever is greater.**

Target Shape

The shape of the target can have an impact on the sensing range. A round object, or an object with a rough surface can affect the damping effect of the sensor, and may require a closer sensing distance. Using a larger sensor size or an extended range sensor will also minimize this effect.