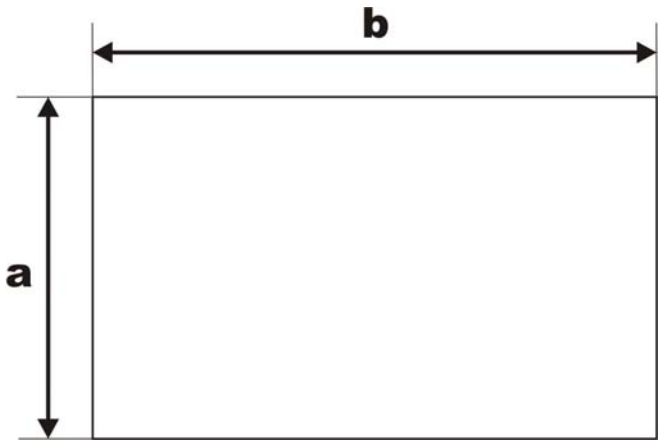
APPLICATION NOTE

How to install loops for the MATRIX inductive loop sensor?

1 Induction loop

Installed Loops are laid in the majority of cases in a quadratic or rectangular form. According to the loops size, a different number of turns of the wire have to be placed into the loop slot.



The table below shows the requested number of turns in a loop with different sizes (side ratio 3:1 = b:a).

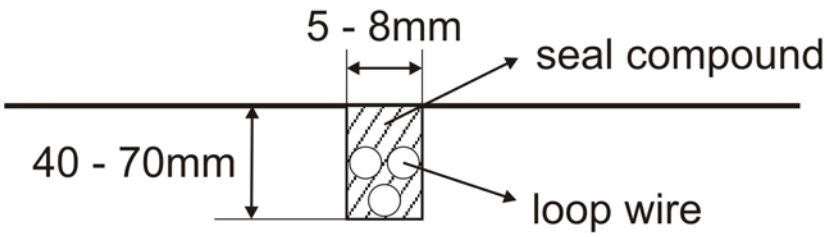
circumference	number of turns	inductivity
4 – 5 m	5	180 – 200 µH
5 – 6 m	4	130 – 160 µH
6 – 15 m	3	140 – 150 µH

2 Installing the loops

To put the Loop into the ground, a slot has to be cut into the concrete or asphalt. This slot should be approx. 40mm – 70mm deep and 5mm – 8mm wide.
Avoid humidity from getting into the slot!

As loop wire can for example be used a standard flexible and isolated chopper line HO7V-K1.5 (NYAF 1.5mm²). A superior cross-sectional area of the cable will improve the sensing capability.

Profile cut:



If the loop slot is sealed with hot bitumen, use a temperature-resistant loop wire!

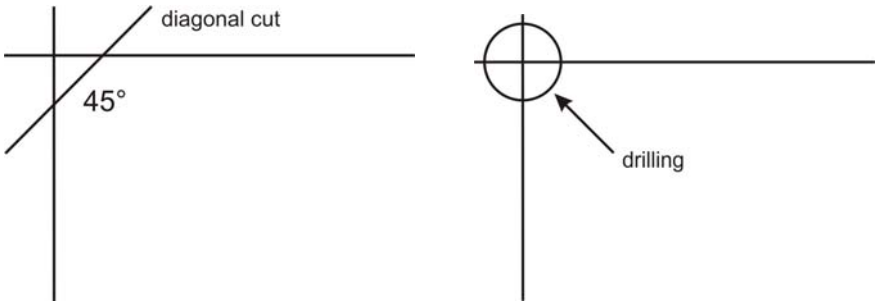
Attention should be paid to the following points when laying induction loops:

- The ground covering has to be continuously solid and without cracks.
- The loop wire must not show any isolation damage
- The loop wire may not jut out of the slot, or isolation will be damaged!
- The loop wires may not move after sealing of the slot.
- The slot has to be clean and dry before sealing!
- Pay attention to the edges when installing a loop.

3 Edges

In the areas of *Doors/Gates and Barriers*, a cut 45° diagonal to the edges should be done to avoid too much strain on the loop cable.

In the area of *Highways*, a hole should be drilled at the edges to round them off. Here is a danger of strain by passing vehicles.



4 Loop feder

Attention has to be paid on following points:

- The two loops feeder cables have to be twisted. About 50 turns per meter with NYAF.
- Please keep a distance of min. 10cm to all other electrical wires.
- Loop feeders of different induction loops have also to be laid by keeping space.
- Do not lay the feeder cable through other loops!
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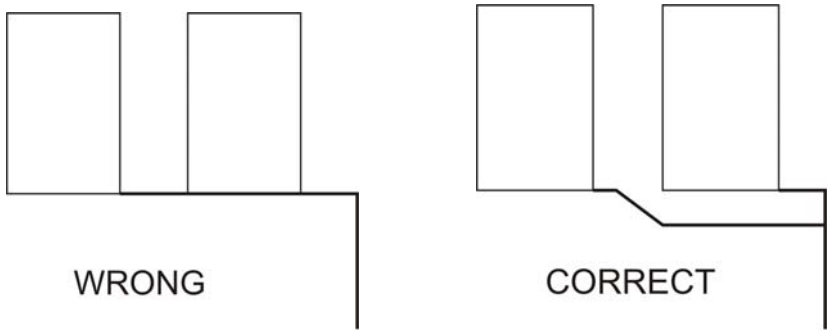
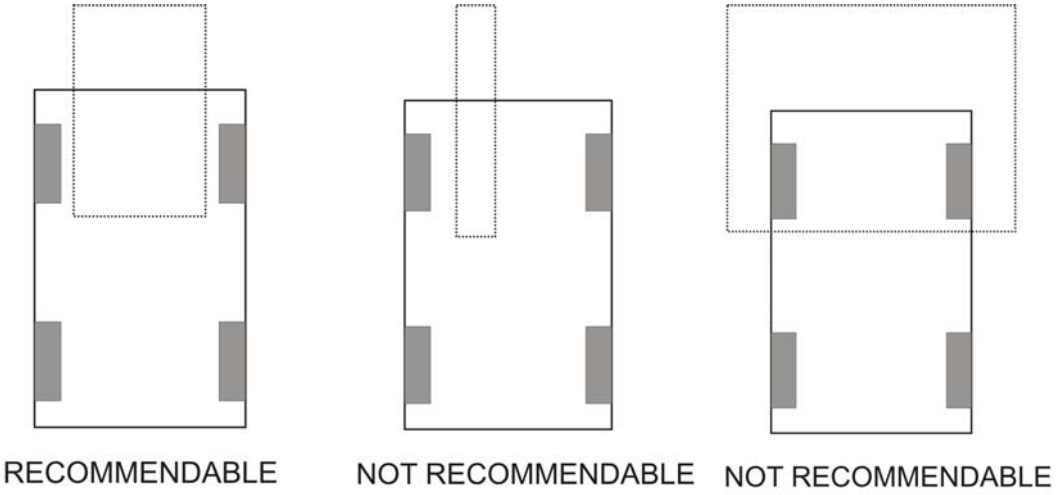
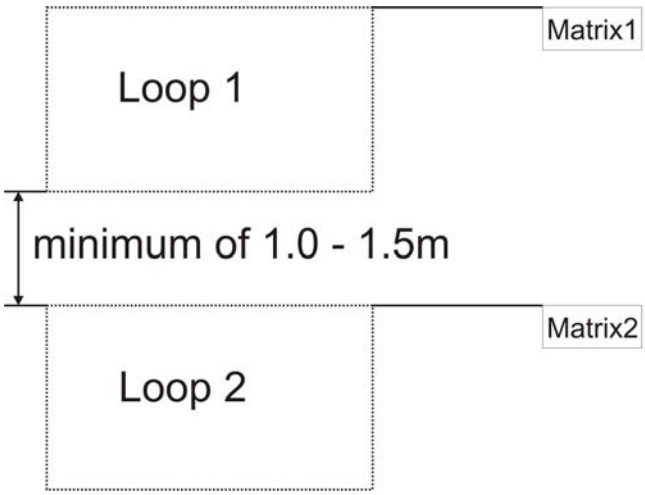


Loop geometry

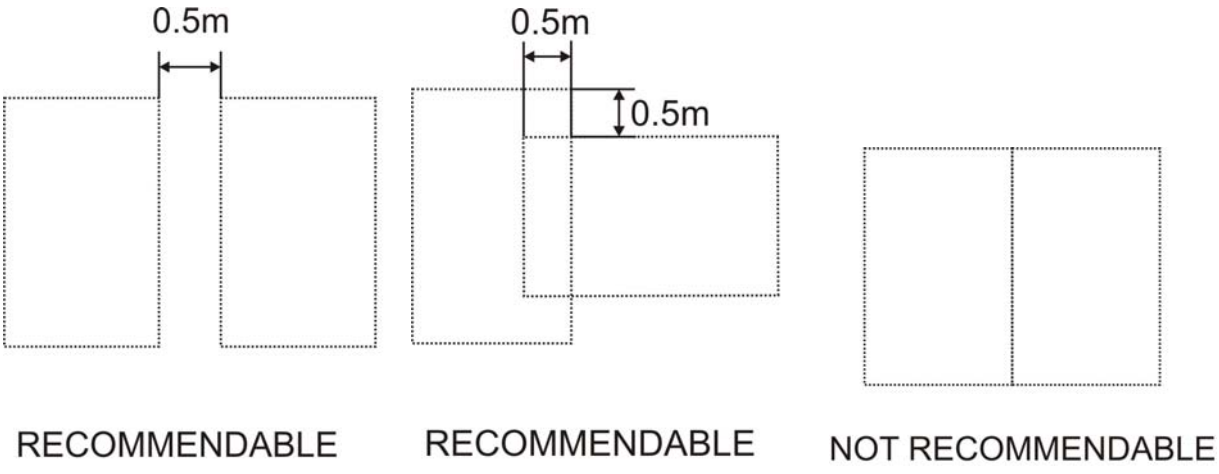
The loop geometry has to be adjusted to the corresponding application. The loop should be a little bit smaller than the vehicles to detect to achieve the highest sensitivity.



Nearby laid loops of different Matrix sensors have to be installed with a space of 1m to 1.5m between each other (depending on the loop size).

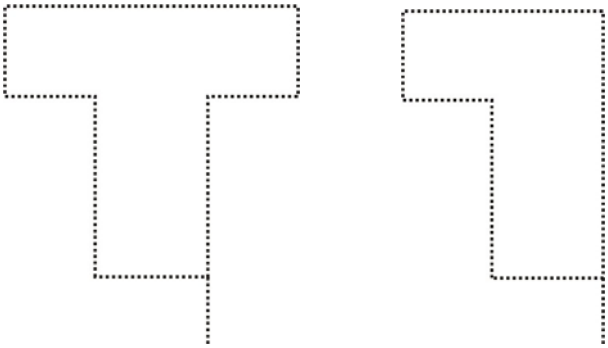


If dualchannel Matrix is used, the loops can be laid near (0.5m) to each other or even in interlocking positions.



6 Special forms

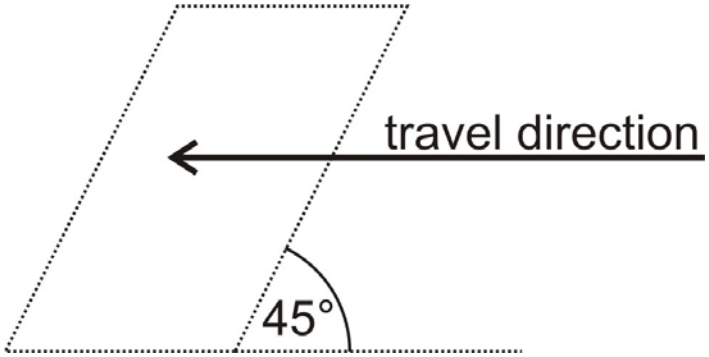
Special Forms can be realised:



Never install a loop in a too narrow or small way, because this will increase the detection. Please take this in account when using loops in applications with vehicles that have a high clearance.
To avoid a fade-out area between axles of lorries and trailer, the loop should have a corresponding length.

7 Two-wheeled vehicle detection

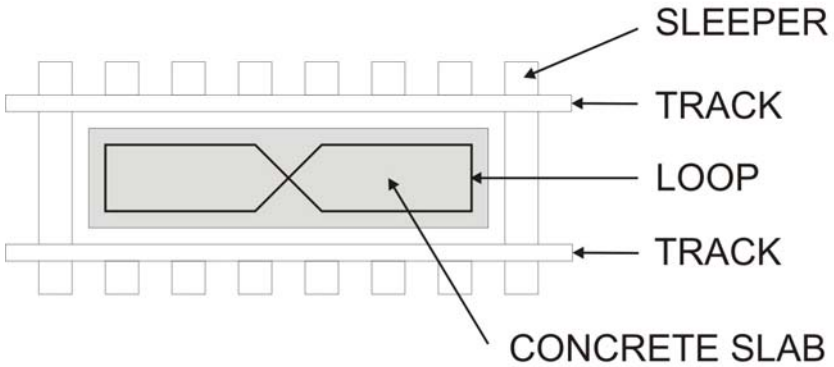
Because two-wheeled vehicles only cause a minor detection, the loop should be laid in an angle of 45° to the travel direction.



8 Railway applications

For railway applications the induction loop has to be laid between the tracks. Please guard at least 20cm between loop and the track!

The loop is laid in the form of an eight to compensate interferences between voltages of current and the loop circuit.
Avoid vibrations!



General tips

- **Take care that the slot is sealed well. Water infiltrations will cause the loop to not detect properly.**
- **Avoid any movement of the loop by properly sealing.**
- **Check the function of the loop after installing.**
- **Twist feeder cable at least 15 times per meter.**
- **Avoid loops longer than 100m or sensitivity will decrease.**
- **Fix the feeder cable firmly to avoid false detections.**
- **Leave enough space between the loop / feeder cable and other electrical wires (including ground heating lines!).**

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