Quick guide

Installation of induction loops for vehicle detection

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General information

This description includes the major aspects which are of importance when inductive loops are planned, installed and initially operated.
For further instructions please refer to our information booklet „Detection of vehicles with inductive loop detectors“.

Inductive loop detectors

An inductive loop which is located below the road surface effects the detection of metal vehicles.
The inductive loop detector evaluates the loop signals and reports the detected vehicles to the following control.

Loop forms

The standard loop form is rectangle.
For the detection of bicycles a trapezium loop or a diagonal rectangle loop should be used.
Between railway tracks a loop with the format of the number eight should be used.

Loop size

A perfect detection will be achieved, when the vehicles completely covers the loop.
Following loop sizes are used in practice:
Loop width should be slightly less than the width of the driving lane, the length of the loop depends on the type of vehicles which is detected:

Vehicle type	Loop width (crosswise)	Loop length (driving direction)
Car	1,5 up to 3 m	1 up to 2 m
Car with trailer	1,5 up to 3 m	2 up to 4 m
Lorry	1,5 up to 3 m	2 up to 5 m
Lorry with trailer	1,5 up to 2 m	5 up to 6 m

Distance between loops

In order to avoid mutual influencing and to note the minimum distance.
Minimum distance = 0,5 x parallel loop side
Some detector types operate according to the multiplex scheme, which means influencing between loops of one detector will not occur and a minimum distance is not necessary.

Number of turns

The loop inductivity has to be within the recommended area. This can be achieved through the amount of loop turns which deduces from the loop size.
Recommended amount of turns for rectangle loops:

Circumference of loop	Amount of turns
less than 3 m	6
3 up to 4 m	5
4 up to 6 m	4
6 up to 12 m	3
more than 12 m	2

Relating to „eight – loops“, only the outside circumference has to be considered.
Detectors of FEIG ELECTRONIC work according to a specially developed scheme, which fully takes advantage of the loop sensitivity and which is not minimized by the amount of turns.

Loop material

Normally, an average plastic isolated copper lead 0,5 up to 1,5 qmm can be used.
In case of hot sealing compound leads which are isolated with silicone should be used.
When loops shall be placed below concrete or paving, preformed loops have to be used.

Loop leads

The loop leads has to be drilled sufficiently. Short loop leads will be effected by leaving the loop wire longer and than drills the ends together (drilling machine). In case of long loop leads, a ready drilled cable can be connected. The maximum permitted resistance (normally 20 Ohm) must not be exceeded.
The connection point has to be sealed water proof.

Placing of loops

- loop has to be fixed exactly inside or below the road surface
- moving actions must not be possible after mounting of loop
- do not install loops in tubes
- road surface must not be hollow
- soft isolation layer are not permitted below the road

Placement below paving

preformed loops should be used.
These have to embedded carefully in sand. The sand cover has to amount al least 3 cm.

Placing in cut slots

The mostly applied placement method on concrete or asphalt roads is the placing of loops in slots, which have to be cut with a special masonry cutting disc.

Width of slot	4 to 10 mm depending on loop wire
Depth of slot	30 to 60 mm depending on working conditions

The slots will be sealed afterwards.
Sealing compounds are depending on conditions:
Cold sealing compounds, hot sealing compounds, fast acting cement, cast resin and others.

Placement in concrete

In order to avoid later cutting actions, it is possible to embed the preformed loops directly in the concrete. A minimum distance of 5 cm to the iron reinforcement has to be ensured by means of braces.
Iron reinforcement or other metal pieces should not be placed above the loop.

Metal pieces nearby inductive loops

Moving metal pieces which are not mechanically fixed, such as manhole covers, metal fences, metal gates disturb the magnetic field. Inductive loops have to be placed at least 1 m away from these moving metal pieces. Regarding metal pieces which are built in steadily, the minimum distances have to be kept also (see concrete reinforcements and metal foils).

Concrete reinforcement

Reinforced concrete reduces the sensibility of inductive loops. A minimum distance of 5 cm has to be kept between the inductive loop and the steel reinforcement.

Metal foils below the surface

In regard to the construction of parking garages and bridges, it becomes more and more common to install metal foil vapour barriers in-between the concrete and the road surface. According to inductive loops, metal foils are to be left out, or a minimum distance of 10 cm between loop and metal foil has to be kept.

Loop placement in the area of radiant heating systems

A common loop installation in the area of radiant heating systems should be avoided, if possible.
In consideration of special measures, however a common placement of inductive loops and electrical heating loops is possible.
Further informations regarding this matter will be given by FEIG ELECTRONIC.

Frequency adjustment	Influencing between adjoining loops and other systems can be avoided by correct adjustment of the loop frequencies. Frequencies of adjoining loops have to be adjusted as far away from eachother as possible. Next to frequency level of the detector, the loop frequency also depends on the loop size and the number of turns. In case of doubt, the frequencies have to be checked with the diagnostic device VEK FG2.
Adjustment of sensibility	By means of the sensibility adjustment, the loss of loop sensibility can be equalized and therefore the sensibility will be matched to the vehicles which have to be detected. In case, only cars shall be detected, a lower sensibility may be chosen. More „complicated“ vehicles, such as lorries, off road vehicles and bicycles, a higher sensibility level should be chosen. The diagnostic unit VEK FG2 makes the adjustment more easy.
Loop diagnosis	Following items belong to the standard equipment which is necessary for the loop diagnosis: - diagnostic measuring device VEK FG2 - isolation measuring device at least 500 V measurement voltage - on request inductivity measuring device - on request test loop (prefabricated loop) Most detectors of FEIG ELECTRONIC are equipped with a connection possibility for a diagnostic device.

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