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bircher REGLOMAT

Schleifeneinbau
Induktionsschleife

Installation of
Inductive loop

Montage de boucles
Boucle d'induction

English

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2. The guarantee and liability become null and void if the customer or a third party performs incorrect modifications or repairs or if the customer does not immediately take all necessary steps in the event of a fault to keep the damage to a minimum and does not give Bircher Reglomat AG the opportunity to remedy the fault.
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1 General

The inductive loop consists of a multi-winding wire coil installed in the floor and makes up the actual sensor element. The inductive loop and the switching unit, referred to as loop detector in the following, form a system for the contact-free detection of metallic objects.

Systems of this kind are used in the following areas:

Gates

Automatic opening and closing of:

- Sliding gates
- Folding gates
- Sectional gates
- Roller gates
- Overhead gates
- Locks
- etc.

Car parks

Monitoring, counting and controlling:

- Barriers
- Parking ticket machines
- Traffic lights
- Individual parking spaces

Rail-mounted vehicles

Opening and closing hall gates,
Detection for other control purposes

Loop detectors from Bircher-Reglomat have the following outstanding features:

- Wide diversity of different types offering from very short to infinite hold intervals
- Automatic adjustment
- Automatic temperature compensation
- Large inductive working area (40-1000 µH)
- Micro-processor controlled
- Three different sensitivity levels

2 Function

The inductive loop and a capacitor which is integrated in the loop detector form an LC oscillator. The frequency of resonance of this resonant circuit is determined by the capacity of the capacitor and the magnitude of the loop inductance. The capacity of the capacitor and thus the resonance frequency can be modified using an internal switch. This prevents interference between two adjacent inductive loops or detectors (Fig. 1).

General rule: The higher the inductance, the lower the frequency of resonance.

If a current is present in the loop, an alternating magnetic field is generated around it. The magnetic field lines close to form loops. When a vehicle moves onto the inductive loop, the alternating field of the loop induces currents in the metallic parts of the vehicle (chassis, axles). These currents generate a magnetic field which opposes the loop field. This results in a change in the loop inductance and thus the frequency.

The loop detector detects this change in frequency. Depending on the detector type, the output relay either energise or release when a predefined switching threshold is exceeded. This switching threshold can be adjusted using the sensitivity switch (High – Medium – Low). «High» means the switching threshold is low, «Low» means the threshold is high. The sensitivity should always be adapted to the respective area of application. Slow frequency changes (e.g. due to temperature variations) do not cause the output relay to switch.

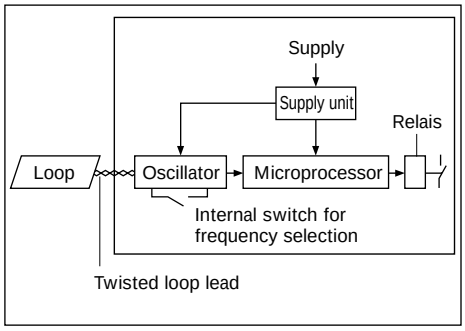

Fig. 1

3 Selecting a suitable loop geometry

The loop geometry must be adapted to the respective application. Sensitivity is optimal if the loop is not bigger than the object to be detected.

For installation reasons, the loops generally have a rectangular design (Fig. 2). This geometry is suited for detecting passenger cars and motor lorries.

Loops installed at a 45° angle with respect to the road are particularly suited for detecting bicycles (Fig. 3).

The so-called figure of eight loops are mainly used for applications requiring low lateral sensitivity or subject to interference voltages caused by currents in railway tracks. The loop is installed in the form of an «8» (Fig. 4). This geometry is used if, for technical reasons, a loop has to be installed very close to a gate.

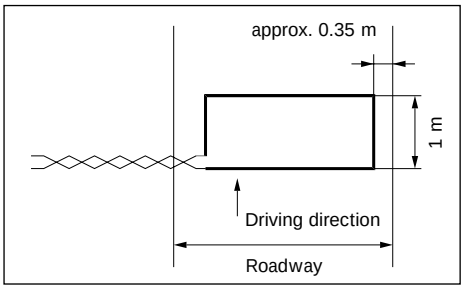

Fig. 2

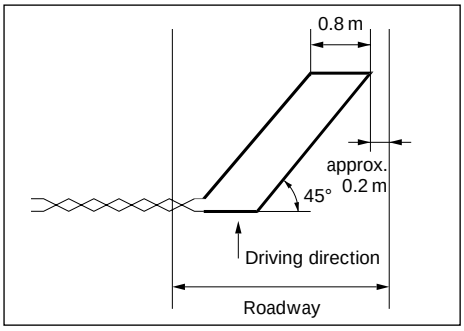

Fig. 3

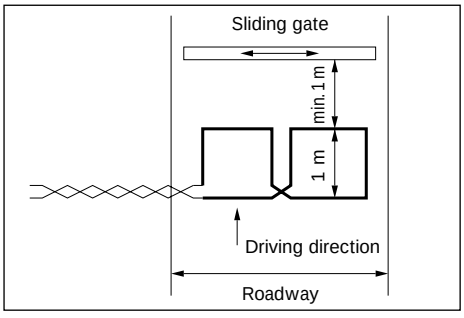

Fig. 4

4 Number of loop windings

The number of windings strongly depends on the circumference of the loop. The smaller the loop, the more windings are required.

Loop circumference	Number of windings
Under 3 m	Contact us
3-6 m	5 windings
6-10 m	4 windings
10-25 m	3 windings
> 25 m	2 windings

5 Installing the loop

After determining the loop geometry, a groove (5-8 mm wide, 30-50 mm deep) must be cut in the floor for installing the loop. We recommend cutting an inclined groove (45° angle) at the corners of the loop. Routing the loop wire along this incline will protect it from excessive wear at the corners.

The groove must then be cleaned avoiding any kind of moisture. Run the loop wire as tight as possible along the very bottom of the groove. You can use commercial copper strand (flexible, insulated, 1.5 mm^2) as loop wire.

Prior to sealing up the groove, the loop inductance should be checked using a measuring device, and modified as required (optimum value 80-300 µH). Then run a nylon cord along the loop and seal up the groove. Suitable sealing compounds are for example bitumen or artificial resin.

Once the sealing compound has set, an earth leakage measurement must be carried out. The loop detector can then be connected to the power supply.

⚠ **Caution! When sealing up the groove, ensure that the temperature of the sealing compound (e.g. hot bitumen) does not exceed the maximum admissible temperature of the loop insulation, as this might cause an earth fault. Use a heat-resistant insulated wire for such cases.**

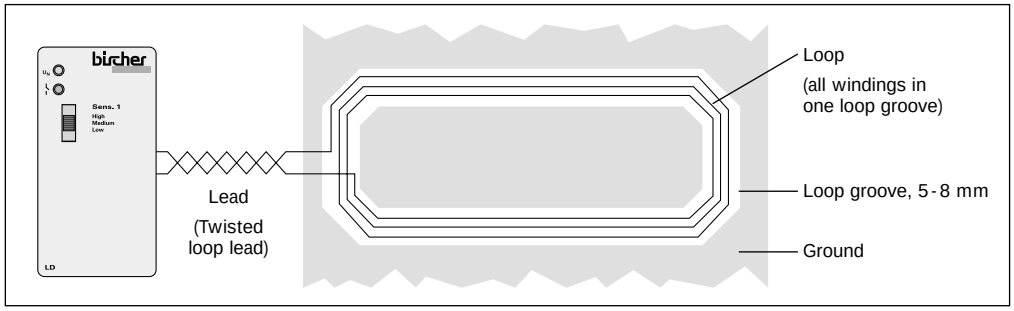

Fig. 5

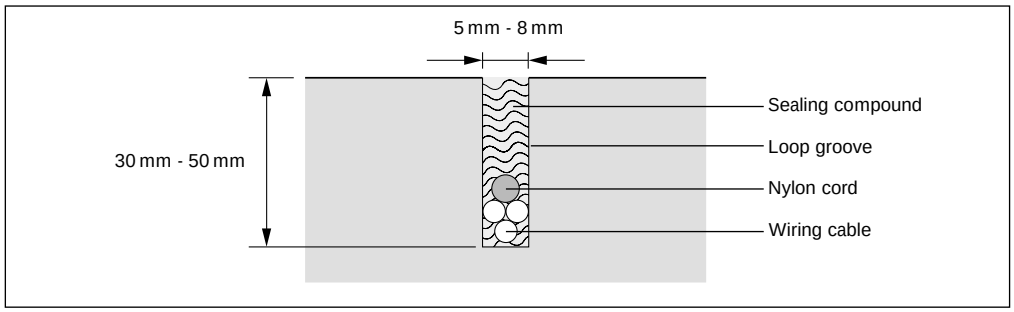

Fig. 6

5.1 Notes on installation

- Select the shortest loop connection wiring possible and route it separately from any power lines. The parallel distance to power lines should be at least 10 cm. A distance must also be kept between the loop connection wirings of different detectors. Both connection wires must be twisted at least 20 times per meter, all the way from the control cabinet to the detector. Connection wires must not be routed through the groove of an adjacent loop and must be protected from mechanical damage.
- If the loop is to be installed in soft ground, ensure that vehicles moving onto the loop and the connection wiring will not cause them to move. Every single winding and the loop itself must be in an absolutely fixed position. Movements of the loop or individual windings can cause false tripping.
- The distance to adjacent loops or movable metallic objects (e.g. sliding gates) must be at least 1 m (Fig. 7).
- A maximum distance should be kept from reinforced concrete. This distance must be at least 40 mm. There must be no movable objects (e.g. gratings, gully covers) in the loop detection area.

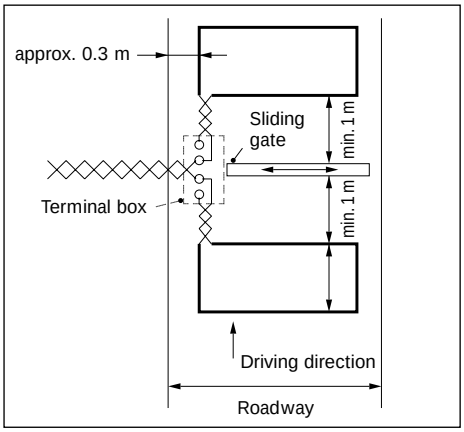

Fig. 7

6 Direction logic

The LD40 2-channel loop detectors are also available with direction logic.

Applications for direction logic:

- Direction dependent control of barriers, gates and doors.
- Detection of ghost drivers.
- Keeping track of the number of vehicles in a parking garage or car park.

This function allows you to determine the direction in which a ferromagnetic object is moving.

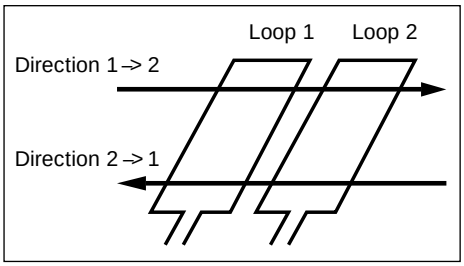

Fig. 8

Direction 1 –> 2:
Output relay 1 energise when first loop 1 and then loop 2 are activated.

Caution: It is essential that both loops be activated simultaneously for a short time. As soon as loop 1 is deactivated again, output relay 1 release. Output relay 2 remains de-energised throughout this time.

Direction 2 –> 1:
Output relay 2 energise when first loop 2 and then loop 1 are activated.

Caution: It is essential that both loops be activated simultaneously for a short time. As soon as loop 2 is deactivated again, output relay 2 release. Output relay 1 remains de-energised throughout this time.

If an object is detected and the corresponding direction is indicated, both loops must be in a non-activated condition again before the next object can be detected.