

MAGNETIC LOOP CONTROL DEVICE

SERIES **R** ACCESSORIES

SMA2



English EN

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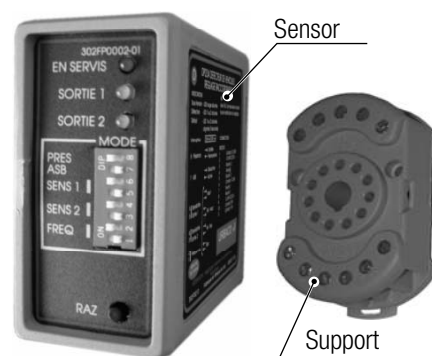
1. DESCRIPTION

The 1 channel SMA sensor is a vehicle detector using electromagnetic loops. It is fitted with a microprocessor and has been designed for access and traffic flow controls

The operating principle involves measuring the inductance variation in the magnetic loop caused when a vehicle passes over it.

Inside the sensor, the measuring circuits for the two channels are multiplied to limit oscillations and interference that could be formed between the magnetic loops.

SMA is complete with an 11-pin support/terminal block for connection to the loops and the 12 or 24 Vac/dc power supply.



2. TECHNICAL FEATURES

ELECTRIC SPECIFICATIONS

Supply voltage 12/24 V ac/dc

Current draw 20 mA max

Outlet relays Max capacity: 5 A at 230 Vac - Closed contact

Magnetic loop inductance Between 20 and 1000 μ H

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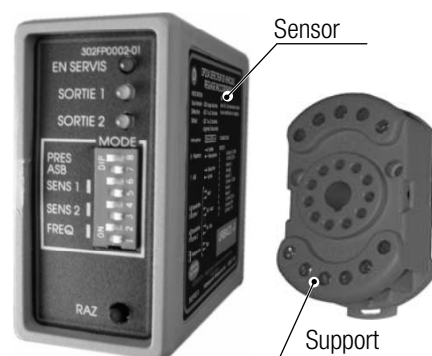
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MECHANICAL SPECIFICATIONS

<i>Materials</i>	ABS plastic casing
<i>Fastenings</i>	Pressure sensor on the connector; connector mounted on DIN guides or screw in place
<i>Measurements LxHxP</i>	42 x 78 x 103 mm (sensor + connector)
<i>Weight</i>	230 g
<i>Operating temperature</i>	-40 / +70 °C
<i>Protection rating</i>	IP30

FUNCTIONAL SPECIFICATIONS

<i>Sensitivity</i>	4 ranges, selected through 2 dipswitches: - High sensitivity: 0.02%, L/L - Medium-high sensitivity: 0.05%, L/L - Medium-low sensitivity: 0.10% L/L - Low sensitivity: 0.50% L/L
<i>Working frequency</i>	High or low frequency, selected from a dipswitch; the frequency level depends on the size of the magnetic loop
<i>Output impulse length</i>	200 ms
<i>Response time</i>	100 ms
<i>Visual indicators</i>	- 1 red power on led - 2 green leds for sensor activities
<i>Relay outputs</i>	2 "presence" mode outputs

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3. INSTALLING THE MAGNETIC LOOPS

3.1. Operating principles

The inductive loop sensor detects the presence of a vehicle on the surface marked out by a cabled loop, formed of 2 or more runs of leads beneath the road surface.

When a vehicle goes over the loop the relative inductance measured by the sensor is reduced.

This detection activates a relay and its contacts are used to guide the external devices.

The magnetic loop and the loop tail must be formed of a simple isolated lead, without any connections, in multithread copper, with a minimum section of 1.5 mm² (16 AWG).

It is not advisable to make connections to the magnetic loop or to the power pack. However, if it is unavoidable they must be welded and isolated in a waterproof case.

This is very important to guarantee long lasting detection reliability.

3.2. Operating limits

3.2.1. Use of adjacent SMA sensors

When the magnetic loops are too close to each other, the respective magnetic fields could overlap and disturb the detection or damage the sensors.

There are various solutions to prevent this:

- use different frequencies for each magnetic loop.
- keep the two groups of loops at least 2 meters away from each other.

3.2.2. Interference caused by metal masses

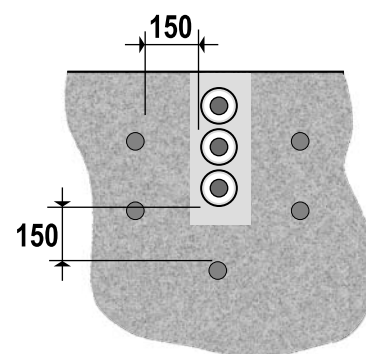
If there is any metal under the loops, especially if they are laid in reinforced concrete, it reduces the impedance and consequently the sensitivity of the sensor.

To compensate this reduction, two turns can be added to the detection loop.

Otherwise provide a minimum space of 150 mm between the magnetic loop and the reinforcing.

If the loop tail is channelled with other cables, ensure that they are screened.

Clean and dry the cable duct before laying the cable.



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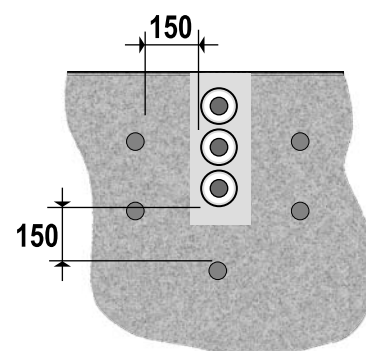
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3.3. Magnetic loop geometry

3.3.1. Dimensions

The magnetic loop must be rectangular with the longest side perpendicular to the circulation direction. There must be a minimum width of 1 m.

The surface must measure at least 1 m² and no more than 30 m². For a traditional road we advise an area of 1.5 – 2 m².

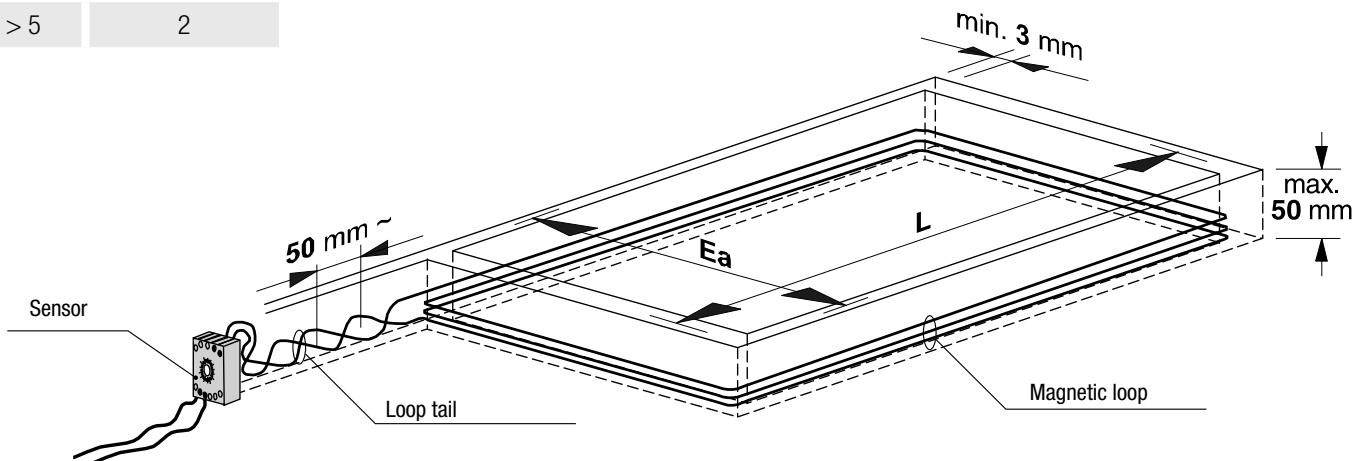
Table with indication of the number of turns per surface:

Area m ²	Number of turns
< 3	4
3 < 5	3
> 5	2

3.3.2. Magnetic loop tail

The tail is the connecting lead between the magnetic loop and the sensor. It is formed of a twisted, armoured cable, or a pair in isolated multi-pole copper, with a minimum section of 1.5 mm² and twisted with 20 turns per meter.

The tail must not be any longer than 25 m.



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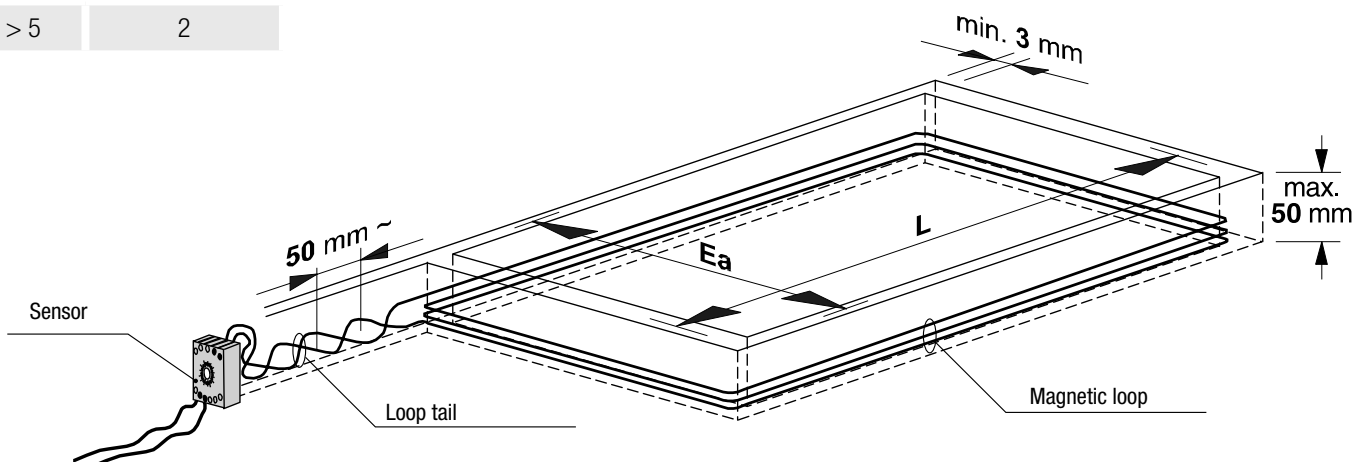
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4. CONNECTIONS

1	12 – 24 V ac/dc	7	Contact 2 (NC)
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3	Loop 1	9	Ground
4	Loop 1	10	Contact 1 (NC)
5	Loop 2	11	Contact 1 (COM)
6	Loop 2		



The relays in contacts 1 and 2 are prepared for just security purposes (photo cell type).

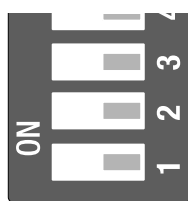
5. SETTING THE FUNCTIONS

5.1. Description

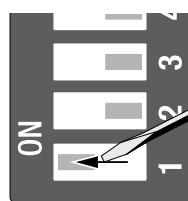
The leds and dipswitches for setting the functioning parameters are in the front part of the sensors.

Use a screwdriver for the ON/OFF selection.

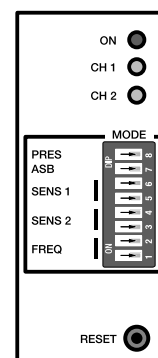
All the dipswitches are on OFF for default.



Dipswitch OFF
(default)



Dipswitch ON



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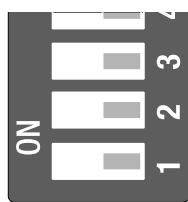
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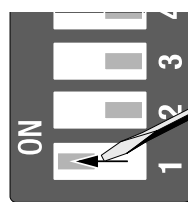
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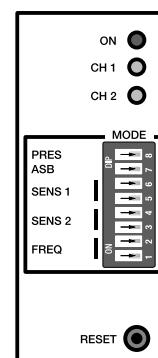
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5.2. Setting the parameters

5.2.1. Dipswitches 1 and 2: regulating working frequency

These dipswitches are used to select the working frequency for the magnetic loop: this is useful when there is more than one sensor in a confined area. Generally, high frequency is used for the magnetic loop with the highest inductance.

Dipswitch 1 and 2 OFF: Frequency is regulated on HIGH



Dipswitch 1 OFF and 2 ON: Frequency is regulated on MEDIUM-HIGH



Dipswitch 1 ON and 2 OFF: Frequency is regulated on MEDIUM-LOW



Dipswitches 1 and 2 ON: Frequency is regulated on LOW



5.2.2. Dip 3 e 4 - CH2 channel sensitivity regulation

These dipswitches are used to regulate the detection sensitivity. In areas with low selection or interference, it is advisable to lower the sensitivity.

Dipswitches 3 and 4 OFF: MAXIMUM detection sensitivity



Dipswitch 3 OFF and 4 ON: MEDIUM-MAXIMUM detection sensitivity.



Dipswitch 3 ON and 4 OFF: MEDIUM-MINIMUM detection sensitivity



Dipswitch 3 and 4 ON: MINIMUM detection sensitivity



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5.2.3. Dip 5 e 6 - CH1 channel sensitivity regulation

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Dipswitches 5 and 6 OFF: MAXIMUM detection sensitivity



Dipswitch 5 OFF and 6 ON: MEDIUM-MAXIMUM detection sensitivity.



Dipswitch 53 ON and 6 OFF: MEDIUM-MINIMUM detection sensitivity



Dipswitch 5 and 6 ON: MINIMUM detection sensitivity



5.2.4. Dipswitch 7 – automatically increases ASB sensitivity

This function automatically takes the sensor sensitivity to maximum, so that irregular shaped vehicles are recognised as well (e.g. lorries)

Dipswitch 7 OFF – Automatic sensitivity increase DEACTIVATED




Dipswitch 7 ON – Automatic sensitivity increase ACTIVATED



5.2.5. Dipswitch 8 – Presence length

This dipswitch allows selecting either permanent or limited detection.

 *It is advisable to regulate this dipswitch on "permanent" to ensure access security.*

Dipswitch 8 OFF – LIMITED PRESENCE: the sensor activates the output relay for a preset time, after which the contact is released.



Dipswitch 8 ON – PERMANENT PRESENCE: the sensor leaves the output relay active for as long as the vehicle is over the magnetic loop.



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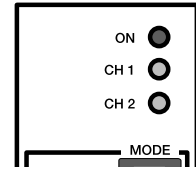
5.3. Signal leds

5.3.1. Red led

- Red led on – signals that the power is turned on. .

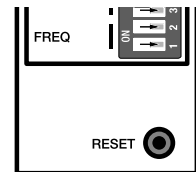
5.3.2. Green leds

- During normal functions, each time a vehicle passes over the magnetic loop the green led lights up for a moment to signal it has detected the vehicle
- Each time the device is turned off (before activating or after the power is turned back on) during automatic setting, the green led flashes for a few moments until the procedure has been completed.
- If the green led flashes twice for one second at regular intervals, it shows there is a fault in the detection loop.
- If the green led remains on and then goes off briefly when a vehicle passes (opposite to the normal function), it shows that there has been a fault or malfunction that has been solved independently: in this case reset the system



5.4. Reset button

SMA automatically starts setting the magnetic loops when the device is turned on. A new setting could be required manually, for example if the sensor parameters have been reset (changing the dipswitches): when the reset button is pressed the setting is started up.



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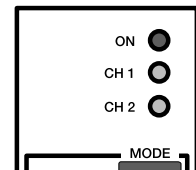
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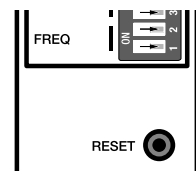
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5.5. Driving direction recognition function

5.5.1. "Direction" mode description

When the vehicle magnetic detector is connected to an access control device, a function could be required that recognises the driving direction of the vehicle (in/out) to allow managing a vehicle counter, for example.

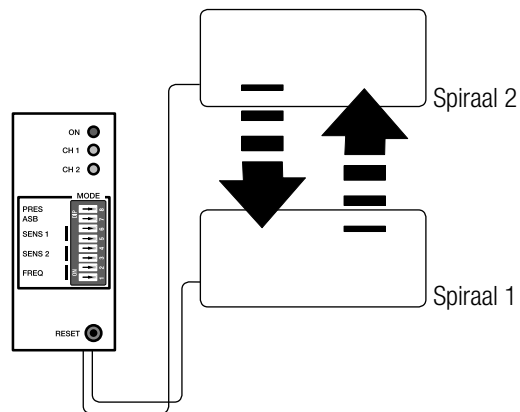
5.5.2. How the "Direction" mode works

To detect the direction of the vehicle 2 magnetic loops must be installed in series and close to each other; depending on the direction of the vehicle, SMA2 will activate one or other of the output relays.

ATTENTION: for the "Direction" mode to work correctly, the two magnetic loops must be close enough so that the vehicle is detected by them both at the same time.

The vehicle must not have left the first loop before it meets the second.

Driving direction	Relay activated
From loop 1 to loop 2	Relay 1
From loop 2 to loop 1	Relay 2



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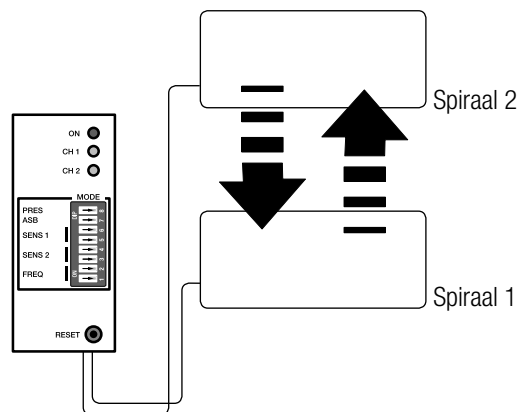
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5.5.3. How to activate the "Direction" mode

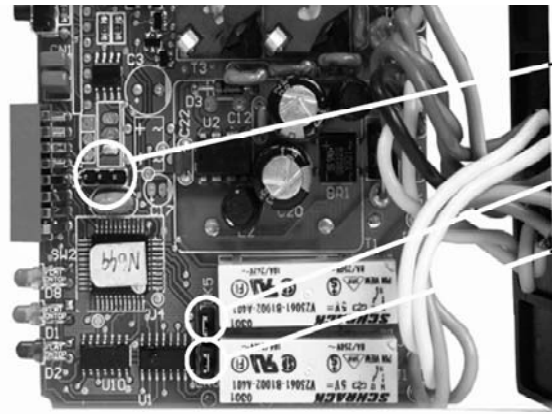
To activate this function, reach the sensor board (see figure A) to change the configuration of 3 jumpers and alter the status of the NC to NO contacts, as shown in figures B and C.

fig. A



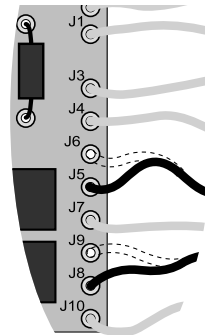
Using a flat screwdriver, carefully force the point as shown and carefully remove the board, pressing on the front and pulling at the bottom (the board slides along a track in the container).

fig. B



Jumper A = left engaged
Jumpers B and C = bridges engaged

fig. C



Unsolder and then re-solder the wires
**From J6 to J5
and from J9 to J8**

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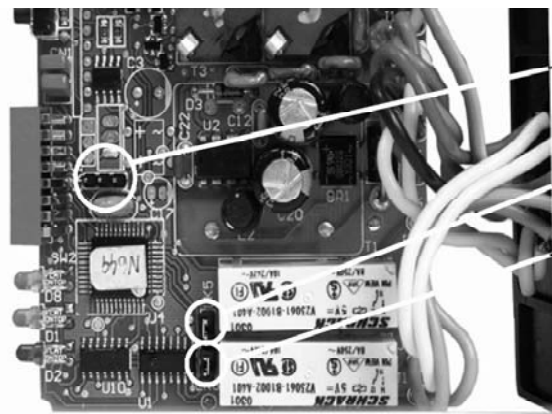
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fig. A



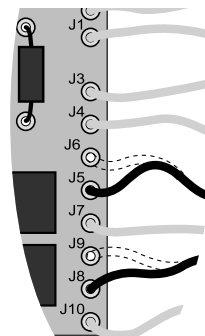
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fig. B



Jumper A = left engaged
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fig. C



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**From J6 to J5
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