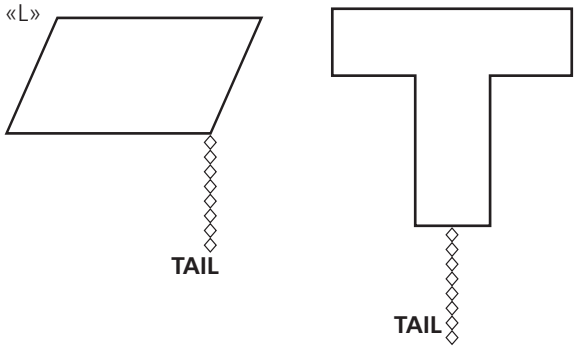
⚠ RECOMMENDATIONS FOR THE SET UP AND MANUFACTURE OF MAGNETIC LOOPS

1 - Realization of the loop

Use a flexible cable, with section 1.5 mm^2
Insofar as possible, the loop must have a square or rectangular shape; the following shapes are admitted: trapeze, T-shaped or «L»



The number of turns depends on the loop perimeter (P):

For square, rectangle or trapeze shaped loops:

Loop perimeter (cm)	Number of turns
P < 300	6
300 < P < 400	5
400 < P < 600	4
600 < P < 1200	3
1200 < P < 1400	2

For T-shaped or «L» shaped loops, the number of turns is:

Loop perimeter (cm)	Number of turns
P = 200	8-9
P = 400	7
P = 600	5-6
P = 800	5
P = 1000	4-5
P = 1200	4
P = 1400	3-4
P = 1600	3

The minimum clearance between two loop cables is 65 cm.
The closest loop cable of a retractable bollard (distance at the axis) or of any mobile metal object is 80 cm
In case that a current line passes close to a loop, it is appropriate that it observes a minimum distance of the loop with respect to the path of the electrical cable:

Type of voltage (T)	Minimum distance
230 V < T < 5000 V	2 meters
5000 V < T	10 meters

2- Loop tail:
Each installation loop has its own loop tail; it is impossible to bind several loops to a detector with a common loop tail.

A loop tail cannot exceed 150 meters (length of the cable).

Realization of the loop tail (Lc)

Lc < 10 m
Starting from the loop corner until the detector bollard, keep the same cable and twist the two wires along the entire length of the loop tail with a minimum of 12 twists per meter.

10m < Lc < 150 m
Make the actual loop by meeting the instructions of paragraph 1.
At the loop corner: make a splice between the loop cable (VGV1.5 2) and the shielded cable (Use a shielded cable of the «Belden» type for the loop tail).
Weld the conductor wires among them (wire to wire welding).
Insulate the thus made splice with a heat shrinkable sleeve.
Connect the thus manufactured loop to the detector and connect the braid of the cable to earthing.

3 - Functional test

Once positioned, proceed with the following measures and check compliance with the following parameters:

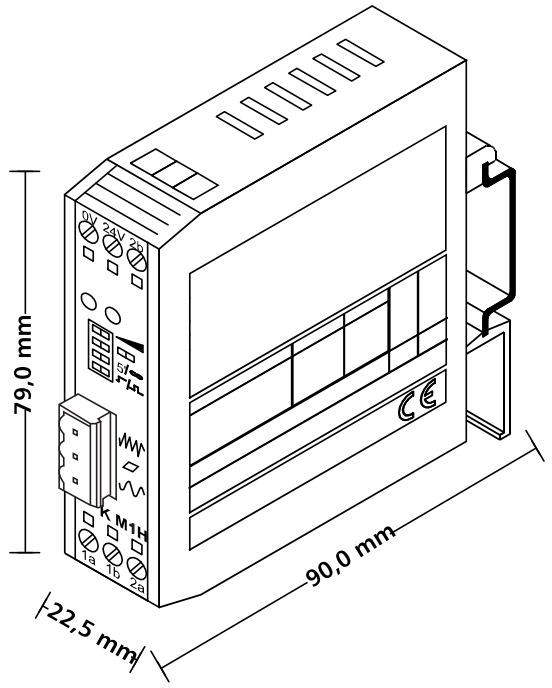
Inductance read at the detector	25-800 mH
Insulation resistance with respect to earthing (measure with the help of an insulator voltmeter)	> 5 MOhm
Internal resistance of the loop and of the loop tail (measure with the help of a multimeter)	< 20 Ohm

4 - As-built drawings and guarantee

Keep the wiring diagram of the loop so that maintenance workers can consult it at any time.

Important:
Production and installation commissioning of the coils affect the smooth operation and system life.

VEK1 LOOP DETECTOR



TECHNICAL DATA

Power supply	24V ac/dc +/-10%
Power consumption	1.5W max
Operating temperature	-20 ÷ 70 °C
Humidity	95% max
Loop inductivity	25 - 800 µH consigliati : 100 - 300uH
Frequency range	30 - 130 kHz
Sensitivity (df/f)	0.01% - 0.65%
Loop lead length	250 m
Relays	1 presence relay 1 pulse relay
Housing	plastic housing for C-rail
Protection	IP40

ADJUSTMENTS

SETTING OPTIONS SENSITIVITY

The setting of the sensitivity is adjustable and gives the frequency deviation which a vehicle must produce for setting the output of the detector.
The sensitivity can be adjusted in 4 steps with the two DIP-switches **s** on top of the front panel.

Sensitivity step	**Channel 1 : DIP 1 and 2** **Channel 2 : DIP 3 and 4**
1 low (0,64% f/F)	■□ ■□
2 (0,16% f/F)	□■ ■□
3 (0,04% f/F)	■□ □■
4 high (0,01% f/F)	□■ □■

HOLD TIME AND RESET

The hold time can be adjusted with DIP-switch **h**.
At the completion of the hold time it will be displayed "free loop" and the detector calibrates automatically.
The hold time starts with the occupation of the loop.

Hold time	**DIP h**
5 minutes	■□
Infinite	□■

An automatic calibration of the loop frequency will be done by the detector after switch-on of the power supply. In case of short power cuts < 0,1 s there is no calibration.
A reset with calibration can be effected by changing the hold time setting.

OPERATION PRINCIPLE OF THE PRESENCE RELAY

The detector has one relay for presence output and another relay for pulse output each with a potential free contact.

The operation principle of the pesence relay can be changed with the DIP-switch **r**.

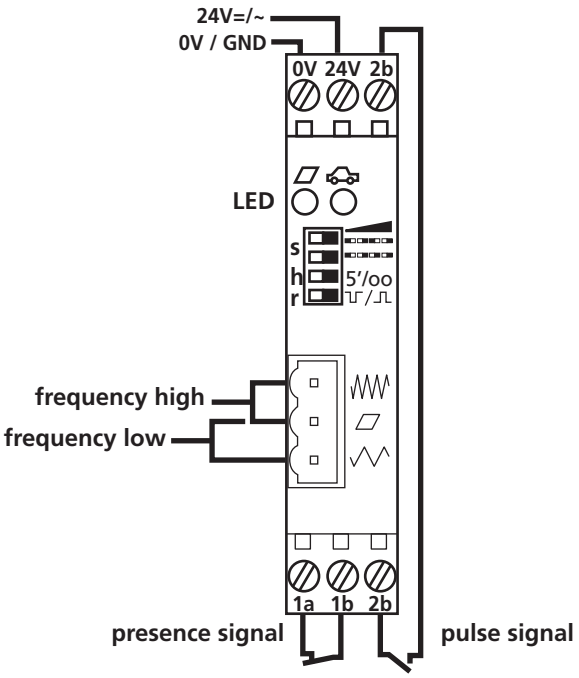
Operation principle of the presence relay	**DIP r**
Contact normally closed	■□
Contact normally opened	□■

FREQUENCY ADJUSTMENT

The operation frequency of the detector can be adjusted in two steps by the 3-pole connection jack in the front panel.

The frequency depends on the loop inductivity (depending itself on: loop geometry, number of loop turns and loop lead) and the adjusted frequency step.

CONNECTION DIAGRAM



The following table shows the position of the relay contacts of the relays according to the detector sequence:

Sensor status	Presence relay		Pulse relay
	⊓	⊔	
Free loop	closed	opened	opened
Covered loop	opened	closed	opened
Loop gets free	closed	opened	200 ms pulse
Loop failure	opened	closed	opened
Power off	closed	closed	opened

In case of a loop failure the detector checks the loop condition cyclically and continues after elimination.

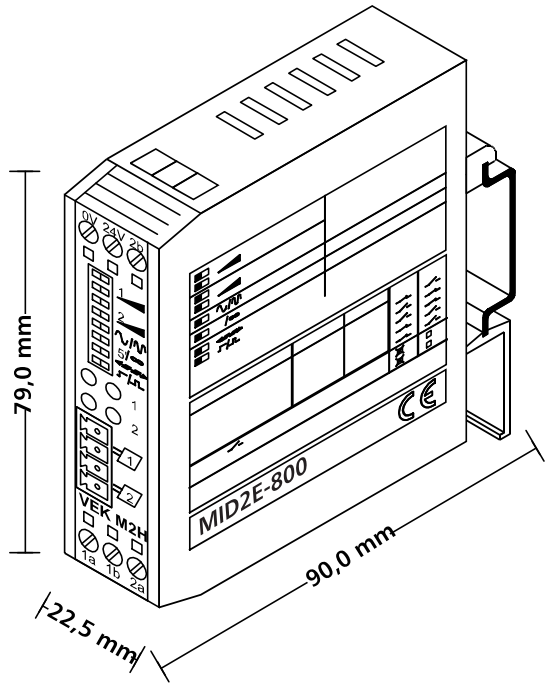
LED-SIGNALS

The green LED signals that the detector is ready for operation.
Via the red LED, the activation of the relays output is announced depending on the occupation status of the loop.

OUTPUT OF THE LOOP FREQUENCY

Approx. 1 s after calibration of the detector the loop frequency will be displayed by pulse signals of the green LED.
Firstly the 10 kHz position of the frequency value will be indicated.
For every 10kHz frequency value the green LED flashes once.
After a break of 1 sec the 1 kHz position is displayed in the same manner.
If there is value of 'O' in the 1 kHz position there will be displayed 10 flashes.
The flashes of the 1 kHz position are a little bit shorter than for the 10 kHz position.

VEK2 LOOP DETECTOR



TECHNICAL DATA

Power supply	24V ac/dc +/-10%
Power consumption	1.5W max
Operating temperature	-20 ÷ 70 °C
Humidity	95% max
Loop inductivity	25 - 800 µH recommended : 100 - 300uH
Frequency range	30-130 kHz
Sensitivity (df/f)	0.01% - 0.65%
Loop lead length	250 m
Relays	2 permanent relays
Housing	plastic housing for C-rail
Protection	IP40

ADJUSTMENTS

SENSITIVITY

The setting of the sensitivity calls the electronics to a value of frequency deviation which a vehicle must produce for setting the output of the detector. The sensitivity can be adjusted for each channel in 4 steps with DIP-switches on top of the front panel.

Livello di sensibilità	**Channel 1: DIP 1 and 2 Channel 2: DIP 3 and 4**
1 low (0,64% f/F)	
2 (0,16% f/F)	
3 (0,04% f/F)	
4 high (0,01% f/F)	

FREQUENCY

The operation frequency of the detector can be adjusted in two steps with DIP-switch 5:

Frequency	**DIP 5**
Low	∿/⋀
High	∿/⋀

The permissible frequency range is 30kHz to 130kHz.
The frequency depends on the loop inductivity (depending itself on: loop geometry, number of loop turns and loop lead) and the adjusted frequency step.

HOLD TIME AND RESET

The hold time can be adjusted with DIPswitch 6.
At the completion of hold time it will be displayed "free loop" and the detector calibrates automatically. The hold time starts with the occupation of the loop.
A reset with calibration can be effected by changing the hold time setting.

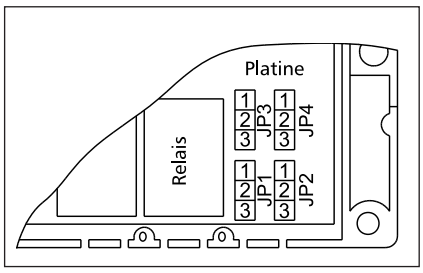
Hold time	**DIP 6**
5 minutes	5'/∞
Infinite	5'/∞

An automatic calibration of the loop frequency starts after power on. In case of short power cuts <0,1s there is no calibration.

OPERATING PRINCIPLE OF THE RELAYS

In standard configuration both relays operate in the closed-circuit current mode where the break contacts are led onto the connections.
The operating principle of the relays can be changed according to the following table.
For this modification, the detector housing must be opened carefully.

Attention!
Static sensitve components are on the board.
During works on the open device precautions are to be taken. Do not touch components or connections on the board. There is no guarantee in case of defects by inappropriate processing!



VEK2 state	Operating principle of the relays			
	I*	II	III	IV
power off				
loop free				
output signal				
loop failure				

* standard configuration

Relay	Jumper	Position					Relay function
1	JP1	1-2		☐		☐	Break contact
		2-3	■		■		Closed contact
	JP3	1-2			☐	☐	Break contact
		2-3	■	■			Closed contact
2	JP2	1-2		◆		◆	Break contact
		2-3	◆		◆		Closed contact
	JP4	1-2			☐	☐	Break contact
		2-3	■	■			Closed contact

◆ changeable by jumper
☐ not changeable
■ optionally setting - change solder link

PRESENCE OUTPUT MODE

For presence output mode DIP-switch 7 is to be set to the left positon. In this mode relay 1 signals presence on loop 1.
The function of relay 2 can be set by DIP-switch 8.

Output mode	DIP 7 DIP 8
Both channels: presence output	◨ ◀▬▶ ◨ ⎍/⎍
Channel 1: presence output Channel 2: pulse when loop gets free	◨ ◀▬▶ ◧ ⎍/⎍

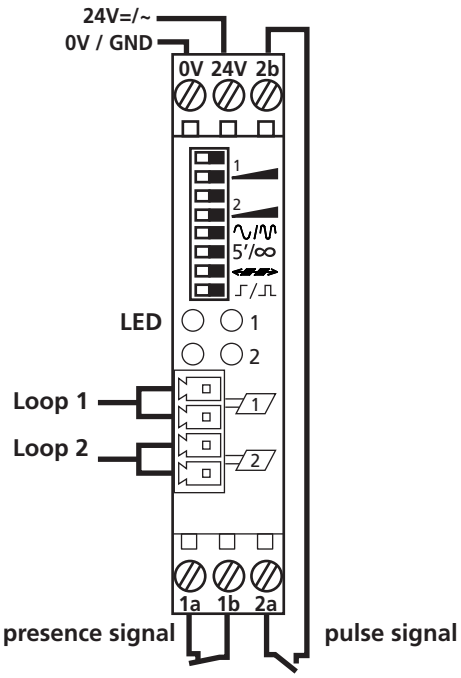
DIRECTION OUTPUT MODE

For direction output mode DIP-switch 7 is to be set to the right positon.
Two direction logics are supported depending on DIPswitch 8.

Output mode	DIP 7 DIP 8
Direction presence signal	◨ ◀▬▶ ◧ ⎍/⎍
Direction pulse signal	◨ ◀▬▶ ◨ ⎍/⎍

The direction pulse signal is normally used for counting systems and the direction pulse signal for gate and barrier controls.
At the examples in the next column the operation principle of the direction logic is explained.
The direction signal is output via the relay of the first covered loop i.e. signaling occurs in the case of driving direction 1–>2 via relay 1 and in the case of driving direction 2–>1 via relay 2.

CONNECTION DIAGRAM



LED DISPLAY

The green LED signals that the detector is ready for operation. Via the red LED, the activation of the relays output is displayed depending on the occupation status of the loop.
Direction output mode

LED green loop control	Led red loop condition	Detector funktion
Off	Off	power off
Flashing	Off	calibration or output of frequenty
On	Off	detector ready for operation, free loop
On	On	det. ready for operation, convered loop
Off	On	loop failure

OUTPUT OF LOOP FREQUENCY

Approx. 1 sec. after calibration of the detector the loop frequency will be displayed by pulse signals of the green LED.
Firstly the 10 kHz position of the frequency value will be indicated. For every 10 kHz frequency value the green LED flashes once.
After a break of 1sec the 1kHz position is displayed in the same manner. If there is value of '0' in the 1kHz position there will be displayed 10 flashes.
The flashes for 1 kHz position are a little bit shorter than for the 10 kHz position.