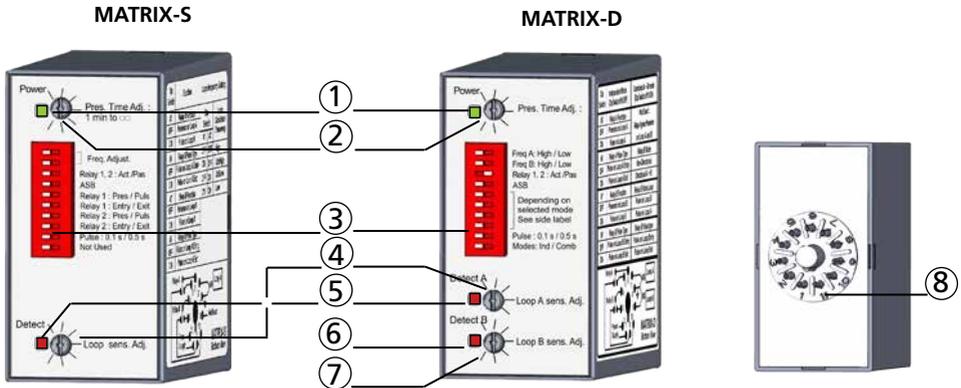


MATRIX

INDUCTIVE LOOP CONTROL BOX

MATRIX-S12-24: single loop with 12 to 24 V AC/DC power supply
 MATRIX-D12-24: double loop with 12 to 24 V AC/DC power supply
 MATRIX-S220: single loop with 220 to 240 V AC power supply
 MATRIX-D220: double loop with 220 to 240 V AC power supply

DESCRIPTION



1. power LED
2. presence time adjustment
3. DIP-switches
4. loop sensitivity adjustment loop A
5. detection status LED loop A
6. loop sensitivity adjustment loop B (MATRIX-D only)
7. detection status LED loop B (MATRIX-D only)
8. main connector

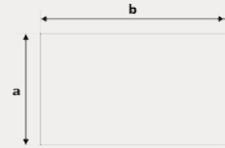
TECHNICAL SPECIFICATIONS

Technology:	inductive loop
Tuning:	automatic
Detection mode:	presence or pulse
Presence time:	1 min to infinity
Pulse time output:	100 ms or 500 ms
Inductance range:	20 μ H to 1000 μ H
Frequency range:	20 kHz to 130 kHz
Frequency steps:	MATRIX-S: 4, MATRIX-D: 2x2
Sensitivity (Δ L/L):	0.005% to 0.5%
Reaction time:	25 ms
Power supply:	MATRIX-S & -D 12-24: 12-24 V AC/DC +/-10% MATRIX-S & -D 220: 230 V AC +/-10%
Mains frequency:	48 to 62 Hz
Power consumption:	< 2.5 W
Degree of protection:	IP40
Temperature range:	-30 $^{\circ}$ C to +70 $^{\circ}$ C (storage); -30 $^{\circ}$ C to +40 $^{\circ}$ C (operating)
Output:	2 relays (free potential change-over contact)
Max. contact voltage	230 V AC
Max. contact current	5 A (resistive)
LED indicators:	green LED: power; red LED: loop status
Protections:	loop insulation transformer, zener diodes, gas discharge clamping
Main connector:	standard 11-pin round connector 86CP11
Dimensions:	77 mm (H) x 40 mm (W) x 75 mm (D)
Weight:	< 200 g
Product compliance:	R&TTE 1999/5/EC

1 LOOP INSTALLATION

Loops are mostly installed in a quadratic or rectangular form. According to the loop size, the loop wire has to be turned a different number of times in the slot.

The table below shows the requested number of turns in a loop according to the loop size (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

TIP!

See application note for detailed instructions.



2 WIRING



- PIN 1 power supply
- PIN 2 power supply
- PIN 3 relay B - NO
- PIN 4 relay B - COM
- PIN 5 relay A - NO
- PIN 6 relay A - COM
- PIN 7 loop A (MATRIX-S+D)
- PIN 8 loop common and earth
- PIN 9 loop B (MATRIX-D)
- PIN 10 relay A - NC
- PIN 11 relay B - NC

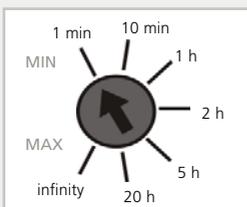
Relay socket references:

- OMRON PF113A-D
- MAGNECRAFT 70-465-1
- IDEC SR3P-05C
- ERSCE ES11
- CUSTOM CONNECTOR CORPORATION OT11

IMPORTANT! Do not remove the grease on the connector's pins.

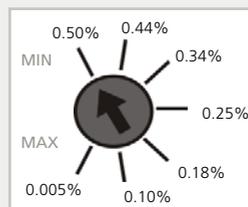
3 POTENTIOMETER ADJUSTMENTS

PRESENCE TIME



Max. duration of presence detection

SENSITIVITY



Sensitivity of the loop

4

DIP-SWITCH ADJUSTMENTS - SINGLE LOOP

MATRIX-S

		OFF	ON
DIP 1	FREQUENCY OF LOOP	high	low
DIP 2	FREQUENCY OF LOOP	high	low
DIP 3	RELAY CONFIGURATION	active	passive
DIP 4	AUTOMATIC SENSITIVITY BOOST	OFF	ON
DIP 5	RELAY A	presence on loop	pulse on loop
DIP 6	RELAY A	entry pulse on loop	exit pulse on loop
DIP 7	RELAY B	presence on loop	pulse on loop
DIP 8	RELAY B	entry pulse on loop	exit pulse on loop
DIP 9	RELAY PULSE DURATION	100 ms	500 ms
DIP 10	NOT USED	-	-

After each DIP-switch change, the sensor launches a learning process.

DIP 1&2: FREQUENCY

DIP 1 high
DIP 2 high \supset high

DIP 1 high
DIP 2 low \supset medium low
(high - 25%)

DIP 1 low
DIP 2 high \supset medium high
(high - 20%)

DIP 1 low
DIP 2 low \supset low
(high - 30%)

DIP 3: RELAY CONFIGURATION

active mode

passive mode

no detection



detection



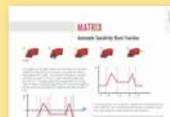
DIP 4: AUTOMATIC SENSITIVITY BOOST

The ASB function is recommended for detection of elevated vehicles such as trucks, but also for all-terrain vehicles.

During detection, the sensor automatically multiplies the sensitivity set by the potentiometer by 8. The sensitivity is limited to the maximum sensitivity and returns to its initial value after detection.

TIP!

See application note for more information.



4

DIP-SWITCH ADJUSTMENTS - DOUBLE LOOP

INDEPENDANT MODE

OFF

ON

MATRIX-D

DIP 1	FREQUENCY OF LOOP A	high	low
DIP 2	FREQUENCY OF LOOP B	high	low
DIP 3	RELAY CONFIGURATION	active	passive
DIP 4	AUTOMATIC SENSITIVITY BOOST	OFF	ON
DIP 5	RELAY A	presence on loop A	pulse on loop A
DIP 6	RELAY A	pulse on loop A - entry	pulse on loop A - exit
DIP 7	RELAY B	presence on loop B	pulse on loop B
DIP 8	RELAY B	pulse on loop B - entry	pulse on loop B - exit
DIP 9	RELAY PULSE DURATION	100 ms	500 ms
DIP 10	MODES	independant	combined

COMBINED MODE

OFF

ON

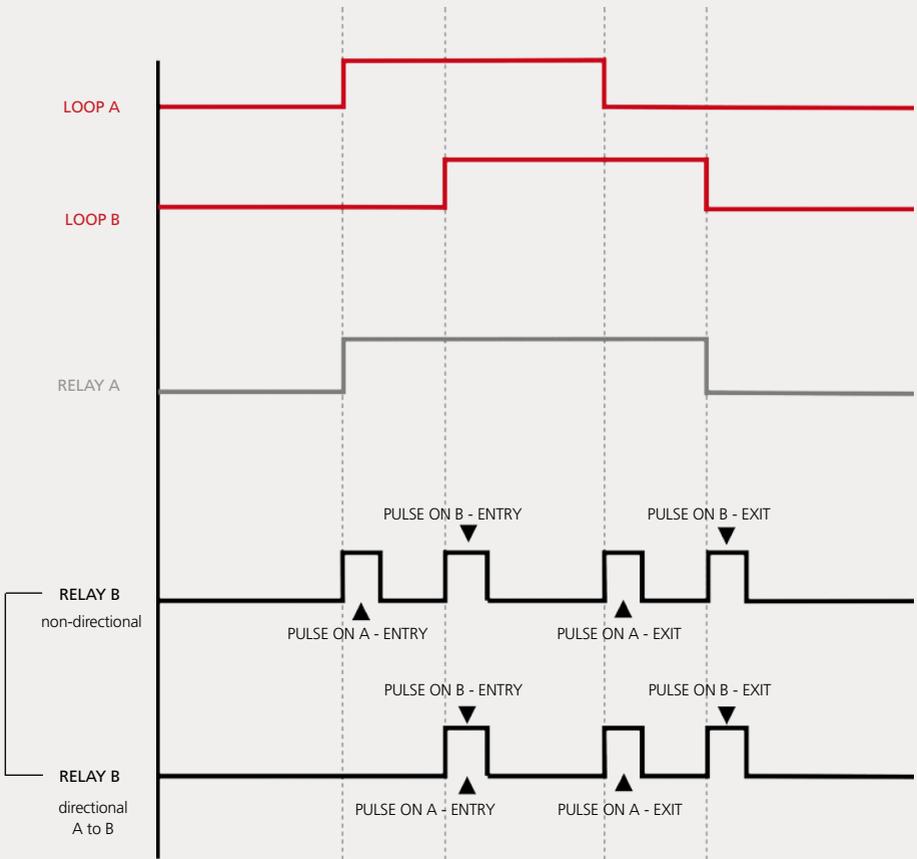
MATRIX-D

DIP 1	FREQUENCY OF LOOP A	high	low
DIP 2	FREQUENCY OF LOOP B	high	low
DIP 3	RELAY CONFIGURATION	active	passive
DIP 4	AUTOMATIC SENSITIVITY BOOST	OFF	ON
DIP 5	NOT USED	-	-
DIP 6	RELAY B	non directional	directional (from A to B)
DIP 7	RELAY B	pulse on loop B	pulse on loop A
DIP 8	RELAY B	pulse on loop - entry	pulse on loop - exit
DIP 9	RELAY PULSE DURATION	100 ms	500 ms
DIP 10	MODES	independant	combined*

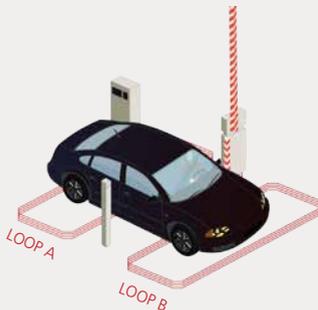
- * RELAY A gives a presence signal if there is a presence on loop A or B (not adjustable)
RELAY B gives a pulse signal (not adjustable) according to DIP 6-7-8.

After each DIP-switch change, the sensor launches a learning process.

DIP 10: COMBINED MODE + DIP 6 ON



In order to enable directional detection, the 2 loops should be installed close to each other. When a vehicle is not detected anymore on loop A whilst entering loop B, no relay output will be triggered.



TROUBLESHOOTING

	The loop detector does not work.	There is no power supply.	1 Check power supply.
	The loop detector does not work.	The loop is shorted.	1 Check the loop cabling.
 1Hz	The loop detector does not work.	The oscillation frequency is too low or the loop is open.	1 Adjust the frequency (DIP-switch 1 & 2) or change the loop turns.
 2Hz	The loop detector does not work.	The oscillation frequency is too high.	1 Adjust the frequency (DIP-switch 1 & 2) or change the loop turns.
	The loop LED is functioning properly, but no contact is made.	Bad connection of the relay contacts.	1 Check relay connections.

LED-SIGNAL

	Power		Loop detection status		LED flashes		LED flashes quickly		LED is off
			Oscillation frequency						
			Troubleshooting						

During normal functioning, the red LED is ON as long as the loop detects a metal object.

On power on, the red LED displays the oscillation frequency of the loop measured by the sensor. If for example the LED flashes 4x, the frequency lies between 40 kHz and 49 kHz.

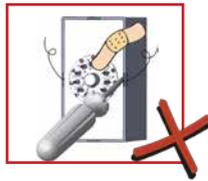
SAFETY INSTRUCTIONS



Only trained and qualified personnel may install and setup the sensor.



Test the good functioning of the installation before leaving the premises.



The warranty is void if unauthorized repairs are made or attempted by unauthorized personnel.

The manufacturer of the global system is responsible for carrying out a risk assessment and installing the device and the global system in compliance with applicable national and international regulations and standards on safety. Other use of the device is outside the permitted purpose and can not be guaranteed by the manufacturer. The manufacturer cannot be held responsible for incorrect installations or inappropriate adjustments of the device.

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BEA hereby declares that the MATRIX-S & MATRIX-D is in conformity with the basic requirements and the other relevant provisions of the directive 1999/5/EC.



Only for EC countries: According the European Guideline 2012/19/EU for Waste Electrical and Electronic Equipment (WEEE)

