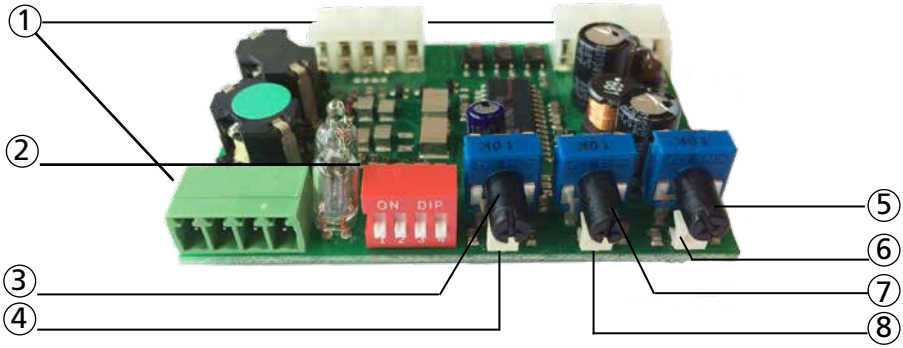
MATRIX PLUG-IN PC

Inductive loop control PCB with optocoupler output

MATRIX PLUG-IN S24 C PC: for single loop (S-version)
MATRIX PLUG-IN D24 D PC: for double loop (D-version)

DESCRIPTION



1. main connectors
2. DIP-switch
3. loop sensitivity adjustment - loop 1
4. detection status LED - loop 1
5. presence time adjustment
6. power LED
7. loop sensitivity adjustment - loop 2 (D-version only)
8. detection status LED - loop 2 (D-version only)

TECHNICAL SPECIFICATIONS

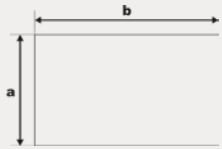
Technology:	inductive loop
Tuning:	automatic
Detection mode:	presence
Presence time:	1 min to infinity
Inductance range:	20 µH to 1000 µH
Frequency range:	20 kHz to 130 kHz
Frequency steps:	S-version: 4; D-version: 2
Sensitivity (ΔL/L):	0.005% to 0.5%
Reaction time:	S-version: 25 ms; D-version: 50 ms
Setup time at power on:	S-version: 2 s; D-version: 6.5 s
Power supply:	24 VDC +/-20%
Power consumption:	< 2 W
Temperature range:	-30 °C to +70 °C (storage); -30 °C to +55 °C (operating)
Output:	optocoupler (S-version: 1x; D-version: 2x)
Max. switching voltage:	40 V DC
Max. switching current:	10 mA
Max. switching power:	100 mW
Main connector:	2x PC Board Connector MOLEX type KK series 3215, 5 entries 1x FCI 01-381 series (loop connection)
LED indicators:	green LED: power; red LED: loop status
Protections:	loop insulation transformer, zener diodes, gas discharge clamping
Dimensions:	20 mm (H) x 50 mm (W) x 72.5 mm (D)
Weight:	< 50 g
Product compliance:	RED 2014/53/EU, RoHS 2 2011/65/EU

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.

Max. length: 100 m; max. cable cross-section: 1.5 mm²

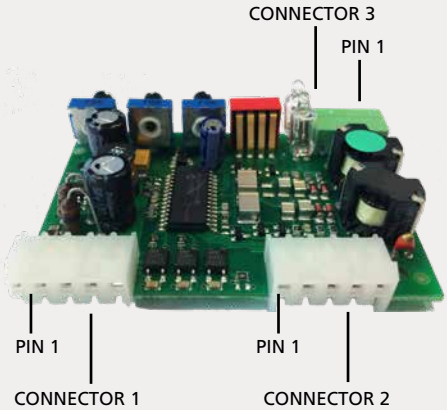
The table below shows the requested number of turns in a loop according to the loop size (side ratio 3:1 = b:a).



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



CONNECTOR 1

PIN 1	GND
PIN 2	24 VDC
PIN 3	GND optocoupler
PIN 4	output 2 (D-version only)
PIN 5	output 1

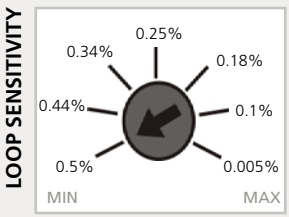
CONNECTOR 2

PIN 1	not used
PIN 2	not used
PIN 3	not used
PIN 4	not used
PIN 5	not used

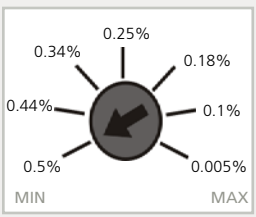
CONNECTOR 3

PIN 1	loop 1
PIN 2	loop 1
PIN 3	loop 2 (D-version only)
PIN 4	loop 2 (D-version only)

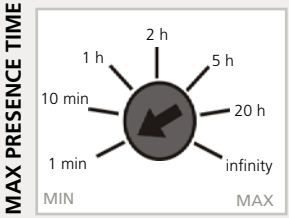
3 POTENTIOMETER ADJUSTMENTS



Loop 1



Loop 2 (D-version only)



Max. duration of presence detection

4 DIP-SWITCH ADJUSTMENTS

S-VERSION Single loop	LOOP FREQUENCY	LOOP FREQUENCY	NOT USED	ASB-FUNCTION
ON	MEDIUM HIGH high - 20%	LOW high - 30%	-	ON
OFF	HIGH	MEDIUM LOW high - 25%	-	OFF

D-VERSION Double loop	FREQUENCY LOOP 1	FREQUENCY LOOP 2	NOT USED	ASB-FUNCTION
ON	LOW	LOW	-	ON
OFF	HIGH	HIGH	-	OFF

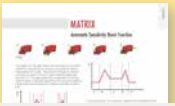
FACTORY VALUES

Automatic sensitivity boost function (ASB)

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

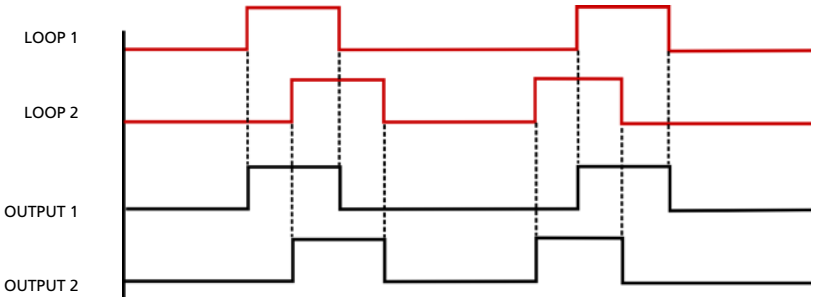
During detection, the sensor automatically multiplies the sensitivity set by the potentiometer by 8. The sensitivity is limited to the maximum sensitivity and returns to its initial value after detection.

TIP!
See application note for more information.



After a oscillation frequency variation of more than 10 %, the sensor automatically launches a learning process.

OUTPUT SIGNAL



LED-SIGNAL

Power

Loop detection status
Oscillation frequency
Troubleshooting

LED flashes

LED flashes quickly

LED is off

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.

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 number of 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 number of loop turns.
	The loop LED is functioning properly, but no contact is made.	Bad connection of the output contacts.	1 Check connections.

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 PLUG-IN is in conformity with the basic requirements and the other relevant provisions of the directives RED 2014/53/EU, RoHS 2 2011/65/EU.

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