MATRIX

Digital, inductive loop sensors

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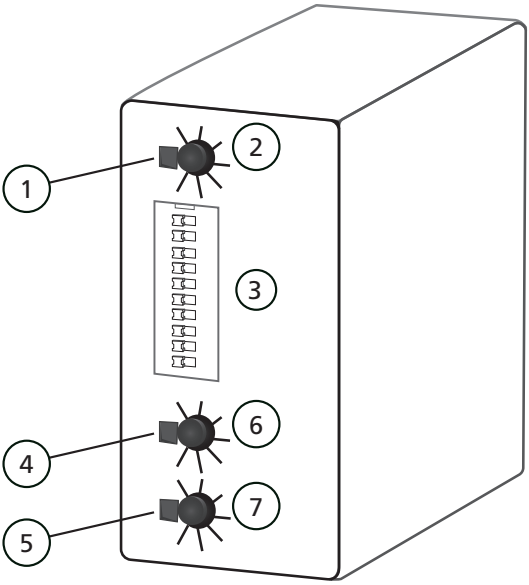


1. Power LED (green)
2. Presence Time adjustment potentiometer
3. DIP switches
4. Detection state LED (red)
5. Detection state LED (red)
6. Sensitivity adjustment potentiometer (dual loop only)
7. Sensitivity adjustment potentiometer

TECHNICAL SPECIFICATIONS

Technology	inductive loop
Tuning	automatic
Detection mode	presence
Presence time	1 min – infinity with 250 steps
Pulse time output	100 ms or 500 ms
Frequency range	20 – 130 kHz
Frequency steps	2 (per loop)
Sensitivity (ΔL / L)	0.005 – 0.5% with 250 steps
Reaction time	50 ms (per channel)
Setup time after configuration	2 sec max (per channel)
Power supply	12 – 24 VAC/VDC ±10% 230 VAC ±10% 115 VAC ±10%
Power frequency	48 – 62 Hz
Power consumption	< 2.5 W
Temperature range (storage)	-22 – 158 °F (-30 – 70 °C)
Degree of protection	IP40
Weight	7 oz (< 200 g)
Protections	loop insulation transformer, zener diodes, gas discharge clamping
Induction range	20 – 1000 H
Dimensions	1.5" (W) × 3.0" (H) × 3.0" (D)
Connection	86CP11 (standard 11-pin round)
Output relays max. contact voltage max. contact current	free of potential changeover contact 230 VAC 5A (res.)
Setup time at power-on	8 s max (per loop)
Norm conformities	R&TTE 1999/5/EC, EMC 89/336/EEC, FCC 47 CFR 15, IC RSS-210 issue 5

Specifications are subject to change without prior notice.
All values measured in specific conditions.

LED INDICATIONS

GREEN = POWER ON

RED = DETECTION

RED (BLINKING) = OSCILLATION FREQUENCY

1 blink = frequency in tens (e.g. 4 blinks = frequency between 40 and 49 kHz)

RED (BLINKING) = TROUBLESHOOTING

If the loop oscillation frequency is outside of the frequency range (20 to 130 kHz), the red LED displays an error message and the sensor activates the corresponding relay. See TROUBLESHOOTING section for frequency errors.

NOTE: The sensor automatically launches a Learn if the oscillation frequency varies more than 10% in comparison with the measurement value.

PRECAUTIONS

CAUTION

- ❑ Shut off all power going to header before attempting any wiring procedures.
- ❑ Maintain a clean and safe environment when working in public areas.
- ❑ Constantly be aware of pedestrian traffic around the door area.
- ❑ Always stop pedestrian traffic through the doorway when performing tests that may result in unexpected reactions by the door.
- ❑ *ESD (electrostatic discharge)*: Circuit boards are vulnerable to damage by electrostatic discharge. Before handling any board, ensure you dissipate your body's ESD charge.
- ❑ Always check placement of all wiring before powering up to ensure that moving door parts will not catch any wires and cause damage to equipment.
- ❑ Ensure compliance with all applicable safety standards (i.e. ANSI A156.10) upon completion of installation.
- ❑ DO NOT attempt any internal repair of the components. All repairs and/or component replacements must be performed by BEA, Inc. Unauthorized disassembly or repair:
  1. May jeopardize personal safety and may expose one to the risk of electrical shock.
  2. May adversely affect the safe and reliable performance of the product resulting in a voided warranty.

FCC COMPLIANCE

FCC ID#: G9B-MATRIX **IC ID#: 4680A-MATRIX**

10MATRIXD110: dual-loop detector with 110 – 120 VAC power supply.
10MATRIXD1224: dual-loop detector with 12 – 24 VAC/DC power supply.

The Digital Transmitters and Receivers comply with Part 15 of the FCC rules. Operation is subject to the following two conditions:

1) This device may not cause harmful interference and;
2) This device must accept any interference received including interference that may cause undesired operations.

Changes or modifications not expressly approved by BEA, Inc. for compliance could void the user's authority to operate the equipment.

BEA, INC. INSTALLATION/SERVICE COMPLIANCE EXPECTATIONS

BEA, Inc., the sensor manufacturer, cannot be held responsible for incorrect installations or incorrect adjustments of the sensor/device; therefore, BEA, Inc. does not guarantee any use of the sensor/device outside of its intended purpose.

BEA, Inc. strongly recommends that installation and service technicians be AAADM-certified for pedestrian doors, IDA-certified for doors/gates, and factory-trained for the type of door/gate system.

Installers and service personnel are responsible for executing a risk assessment following each installation/service performed, ensuring that the sensor/device system performance is compliant with local, national, and international regulations, codes, and standards.

Once installation or service work is complete, a safety inspection of the door/gate shall be performed per the door/gate manufacturer's recommendations and/or per AAADM/ANSI/DASMA guidelines (where applicable) for best industry practices. Safety inspections must be performed during each service call – examples of these safety inspections can be found on an AAADM safety information label (e.g. ANSI/DASMA 102, ANSI/DASMA 107, UL294, UL325, and International Building Code).

Verify that all appropriate industry signage, warning labels, and placards are in place.

LOOP INSTALLATION TIPS

CABLE SPECIFICATIONS FOR LOOP AND FEEDER

- Multi-strand cable, 16 AWG (1.5mm²) cross-section area
- Insulation material: PVC or silicone
- Feeder cable wire must be twisted at least 15 times per yard for each cable
- Feeder for long runs used for foil-screened cable is recommended (ground at equipment end only)
- Feeder cable must be secured to avoid any false detection
  Maximum length: 330' (100 m)
- Waterproof cable junction box is required

LOOP GEOMETRY

- When two adjacent loops are connected to a dual channel sensor, it is possible for these loops to share a common slot, if required. The channels are multiplexed; therefore, no interference will occur.
- Avoid large loops or long feeder, or sensitivity will be affected.
  Maximum length: 330' (100 m)

NUMBER OF LOOP TURNS

1. Measure the length (L) and width (W) of one loop.
2. Multiply to determine the loop surface area.

EXAMPLE:

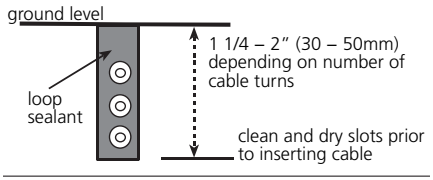
- Length is 10' and width is 3'.
- 10 × 3 = 30
- Area = 30 ft² = 4 loop turns are recommended

AREA	RECOMMENDED NUMBER OF TURNS
< 32 ft²	4
32 – 54 ft²	3
65 – 108 ft²	2

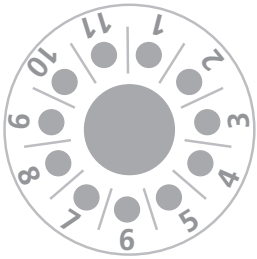
COMPLIANCE:

The loop surface multiplied by the number of turns should not exceed 215 ft² (or 20m²).

SLOT DEPTH



WIRING



PIN 1 power supply
PIN 2 power supply
PIN 3 relay 2 (N.O.)
PIN 4 relay 2 (COM)
PIN 5 relay 1 (N.O.)
PIN 6 relay 1 (COM)
PIN 7 loop A
PIN 8 loop COM (connect to GRN)
PIN 9 loop B
PIN 10 relay 1 (N.C.)
PIN 11 relay 2 (N.C.)

Refer to User's Guide 75.5081 for information regarding the MATRIX Harness.

WARNINGS:

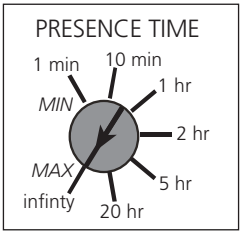
- **Do not remove grease on connector pins.**
- **Pin 8 must be connected to loop and ground.**

UL Requirement: Shall be used with suitable UL-recognized SWIV2 relay socket.

POTENTIOMETER ADJUSTMENTS

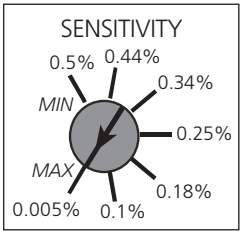
PRESENCE TIME

adjusts maximum duration of presence detection from 1 minute to infinity



SENSITIVITY

adjusts linear sensitivity for loop A and/or B from 0.005% to 0.5%



DIP SWITCH CONFIGURATIONS

NOTE: Any time a DIP switch is changed, the sensor launches a Learn.

DUAL-LOOP (INDEPENDENT)		DIP OFF	DIP ON	
DIP 1	FREQUENCY OF LOOP A	high	low	*note 1*
DIP 2	FREQUENCY OF LOOP B	high	low	*note 1*
DIP 3	RELAY CONFIG	active	passive	*note 2*
DIP 4	AUTOMATIC SENSITIVITY BOOST	off	on	*note 3*
DIP 5	RELAY 1	presence on loop A	pulse on loop A	
DIP 6	RELAY 1	entry pulse on loop A	exit pulse on loop A	
DIP 7	RELAY 2	presence on loop B	pulse on loop B	
DIP 8	RELAY 2	entry pulse on loop B	exit pulse on loop B	
DIP 9	RELAY PULSE DURATION	100 ms	500 ms	
DIP 10	MODES	independent	combined	

DUAL-LOOP (COMBINED)		DIP OFF	DIP ON	
DIP 1	FREQUENCY OF LOOP A	high	low	*note 1*
DIP 2	FREQUENCY OF LOOP B	high	low	*note 1*
DIP 3	RELAY CONFIG	active	passive	*note 2*
DIP 4	AUTOMATIC SENSITIVITY BOOST	off	on	*note 3*
DIP 5	*NOT USED*	–	–	
DIP 6	RELAY 2	non-directional	directional (A→B)	*note 4*
DIP 7	RELAY 2	pulse on loop B	pulse on loop A	
DIP 8	RELAY 2	entry pulse on loop	exit pulse on loop	
DIP 9	RELAY PULSE DURATION	100 ms	500 ms	
DIP 10	MODES	independent	combined	*note 4, 5*

DIP SWITCH CONFIGURATIONS – NOTES

NOTE 1: DIPs 1 and 2

FREQUENCY ADJUSTMENT FOR LOOP A (SINGLE-LOOP DETECTOR)		
LOOP FREQUENCY	DIP 1	DIP 2
high	OFF	OFF
mid-high (high 20%)	ON	OFF
mid-low (high 25%)	OFF	ON
low (high 30%)	ON	ON

DIP SWITCH CONFIGURATIONS – NOTES (cont.)

NOTE 2: DIP 3

DIP OFF

FAIL-SECURE MODE relay is NOT energized when power is applied.

Relay is energized upon detection only. In this mode, the N.O. circuit is open, and the N.C. circuit is closed. Thus, if a closed circuit is required upon detection, one must use the N.O. and COM terminals since they close upon detection.

When the MATRIX is NOT powered, it is in the same state as it would be for non-detection.

DIP ON

FAIL-SAFE MODE relay is energized when power is applied.

Relay is de-energized upon detection or power loss. In this mode, upon powering the detector, the N.O. circuit becomes closed, and the N.C. circuit becomes open. Thus, if a closed circuit is required upon detection, one must use the NC and COM terminals, since they would now be OPEN during non-detection, and would close upon detection.

When the MATRIX is NOT powered, it is in the same state as it would be for detection.

DETECTION STATUS	FAIL-SECURE MODE	FAIL-SAFE MODE
NO DETECTION	COM and N.O. open COM and N.C. closed Relay de-energized	COM and N.O. closed COM and N.C. open Relay energized
DETECTION	COM and N.O. closed COM and N.C. open Relay energized	COM and N.O. open COM and N.C. closed Relay de-energized
UPON POWER LOSS	COM and N.O. open COM and N.C. closed Relay de-energized	COM and N.O. open COM and N.C. closed Relay de-energized

same (FAIL-SECURE MODE)

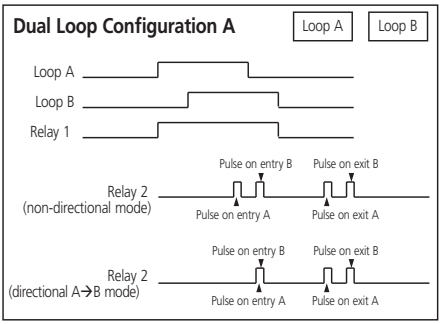
same (FAIL-SAFE MODE)

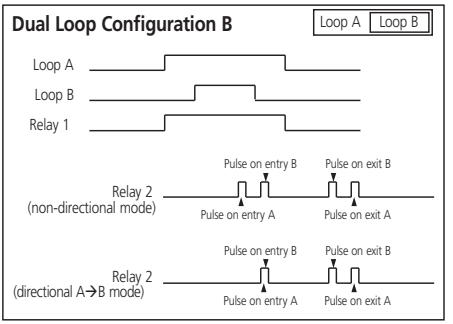
NOTE 3: DIP 4

Automatic Sensitivity Boost (ASB) option is recommended for improved truck detection.

During a detection, the sensitivity increases automatically to 8x the preset sensitivity given by the sensitivity potentiometer adjustment. It is limited to the maximum sensitivity ($\Delta f = 0.005\%$). It goes back to the preset value after detection stops.

NOTE 4: DIP 6 + 10





WARNING:

During detection, the 2 loops must detect simultaneously for a short period to be able to determine the movement direction.

During loop installation, verify that the 2 loops are close enough to each other to ensure a common detection (typically, 3 feet).

DIP SWITCH CONFIGURATIONS – NOTES (cont.)

NOTE 5: DIP 10

Relay 1 gives a presence signal if there is presence on loop A or B (not adjustable).

Relay 2 gives a pulse signal (not adjustable) according to DIPs 6, 7, and 8.

TROUBLESHOOTING

	Loop detector does not work. Green LED is off.	No power supplied to loop detector.	Check power supply.
	Loop detector does not work. Red LED flashes slowly.	Corresponding loop has shorted.	Check loop cable.
 1Hz	Loop detector does not work. Red LED flashes at 1 Hz.	Frequency of oscillation is too low or loop is open.	Adjust frequency using DIP switches 1 and 2 or change loop turns.
 2Hz	Loop detector does not work. Red LED flashes at 2 Hz.	Frequency of oscillation is too high.	Adjust frequency using DIP switches 1 and 2 or change loop turns.
	Loop detects properly, but contact is not made.	Poor connection of relays contacts.	Check relay connections.
	DIP switches 5 – 8 are not responding appropriately.	Function varies according to DIP switch 10.	Increase microwave rejection.

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