OPERATING INSTRUCTIONS

CarSense 303™

MAGNETORESITIVE VEHICLE DETECTOR

EMX INDUSTRIES, INC.

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Cautions and Warnings

CE REQUIREMENT: Use CE rated power supply for CE compliance providing suppression as specified by EN61000-4-5.

Not to be used in safety applications.

IMPORTANT:
This product is an accessory or part of a system. Always read and follow the manufacturer's instructions for the equipment before connecting this product. Comply with all applicable codes and safety regulations. Failure to do so may result in damage, injury or death.

Product Overview

The CarSense 303 features advanced 3-axis, magnetoresistive sensing technology. The sensor measures Earth's magnetic field and responds to disturbances caused by ferrous objects. The CS303 combines this exciting new technology with a field-proven hardware platform to produce a high-sensitivity, compact, cost-effective solution for reliable vehicle detection. Three sensing elements provide magnetic field measurement in the X, Y and Z axes, improving detection sensitivity.

- Three-dimensional presence detection of vehicles
- Select X, Y and/or Z axis independently
- Stand-alone sensor
- Sensor stores ambient background and settings in non-volatile memory
- Remote control module for programming and additional relay contact output
- Fast response for high-speed detection
- Easy, low-cost installation
- ULTRAMETER™ display indicates the sensitivity setting required to detect a vehicle
- Detect-On-Stop (DOS®) feature will allow detection only when a vehicle has come to a complete stop on the sensor. This is a worldwide unique feature to EMX detectors. It is a major advantage if you want to ignore cross traffic in tight spaces.

Specifications

	Sensor	Remote
Sensing Technology	3-axis magnetoresistive	
Sensitivity	10 levels: 0-9	
Axis Sensitivity	512 counts/Gauss (typical)	
Environmental Tracking	Automatic compensation	
Local Magnetic Field Calibration	Averages local field signature in any sensor orientation	
Detection Range	1.5m (5ft)	
Power/Fault Indicator		Green LED
Detect Indicator		Red LED
Pulse/Presence	Allows the relay/NPN output to send either a pulse output or have constant presence	
Detect-On-Stop (DOS®)	Requires vehicle to stop for a minimum of 1 second (1-2s typical)	
Outputs	NPN (open collector)	SPDT relay NPN (open collector)
Output Ratings	50 mA	Relay: 1A @ 24VDC...120VAC NPN: 50 mA (max)
Connection	5 conductor direct burial	10 position screw terminal
Operating Environment	-40° C...82° C (-40° F...180° F) 0...95% relative humidity	
Housing Material	PVC	
Environmental Rating	IP69K	IP30
Power Supply	12-30 VDC	12-30 VDC and 24 VAC
Current Draw	10 mA max	40 mA max
Supply Protection Circuitry	Reverse polarity and fuse protected	
Dimensions	155mm (6.1") x 27mm (1.0")	76mm (3.0") x 22mm (0.9") x 70mm (2.75")
Weight	100g (0.22 lbs.)	68g (0.15 lbs.)

Operation

Power Up

The green LED indicates that the detector is powered and operational. Upon first power-up, the detector will need to be calibrated to the local magnetic field (see Controls and Indicators).

Axis Setting

The sensor module utilizes a three-dimensional AMR (magnetoresistive) module. Each of the three axes (X, Y, and Z) can be turned on or off to optimize directional sensitivity, minimizing the effects of adjacent traffic.

ULTRAMETER™ Sensitivity Display

The ULTRAMETER™ sensitivity display simplifies the installation process by displaying the sensitivity setting required to detect a vehicle near the sensor. To use this feature, observe the display while a vehicle is moving into position near the sensor module, note the number displayed, then adjust the sensitivity setting (rotary switch) to the displayed position.

During normal operation, when a vehicle is not on near the sensor, the display is blank. The effects of cross-traffic interference can be observed on the display when the sensing area is vacant. By selecting the X, Y, and Z axes individually, you can observe the sensitivity of each, tailoring the sensor to your installation.

Sensitivity Setting

The 10-position rotary switch allows for precise adjustment of detection level. The sensitivity level increases from position 0 thru 9 with position 0 being the lowest sensitivity. Typical applications require a setting of 3 or 4. The ULTRAMETER™ sensitivity display simplifies the installation process by displaying the sensitivity setting required to detect a vehicle near the sensor. To use this feature, observe the display while a vehicle is moving into position near the sensor, note the number displayed, then adjust the sensitivity setting (rotary switch) to the displayed position.

Sensor Calibration/Reset

Pressing the reset switch calibrates the sensor to the local magnetic field. This must be used whenever the sensor is moved from its position, and may be necessary if the sensor is exposed to a strong magnetic field.

Detect-On-Stop (DOS®)

The Detect-On-Stop feature requires that a vehicle must come to a complete stop near the sensor for a minimum of 1 second (typical 1-2s) before the output activates.

Presence Output

The presence setting provides two selections: the output can be set for Infinite Presence or Normal Presence. Infinite Presence causes the output to remain in detect mode as long as the vehicle remains near the sensor. Normal Presence causes the output to reset after 5 minutes. **DO NOT USE THE NORMAL PRESENCE SETTING UNLESS THE OPENING IS PROTECTED BY A SECONDARY SAFETY DEVICE SUCH AS THE EMX IRB-4X PHOTOEYE.**

Pulse Output

When the pulse output mode is selected, the output will be activated for approximately 500ms on vehicle entry or exit (depending on status of switch 5).

Delay

The delay setting provides a 2 second delay before activating after the sensitivity threshold is met.

Controls and Indicators

PRESENCE

	DIP switch position 8
Normal	on
Infinite	off

DETECT-ON-STOP (DOS®)

	DIP switch position 7
DOS on	on
DOS off	off

OUTPUT

	DIP switch position 6
Pulse	on
Presence	off

PULSE ON ENTRY/EXIT

	DIP switch position 5
Pulse on exit	on
Pulse on entry	off

DELAY

	DIP switch position 4
2 second delay on	on
2 second delay off	off

AXES SETTINGS

	DIP switch position		
Axis	3	2	1
X	X		
Y		X	
Z			X

SENSITIVITY SETTING

	Position 0.....9
Sensitivity	low.....high

DETECT

	Red LED
Presence detected	on
No presence	off

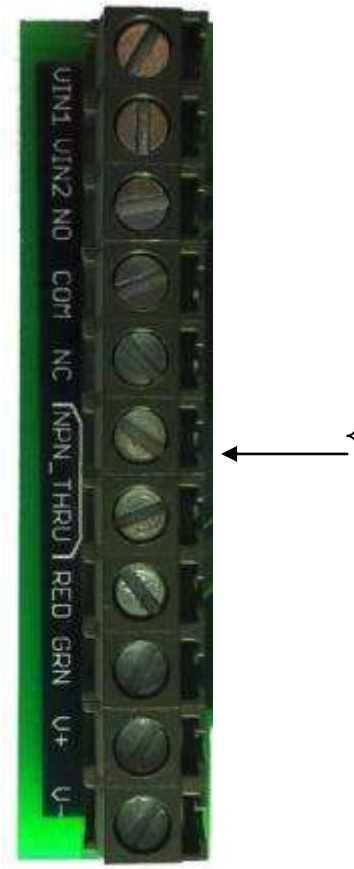
ULTRAMETER™ SENSITIVITY DISPLAY

Indicates sensitivity setting required to detect vehicle

SENSOR CALIBRATION/RESET

Press to calibrate and reset error status

Connections



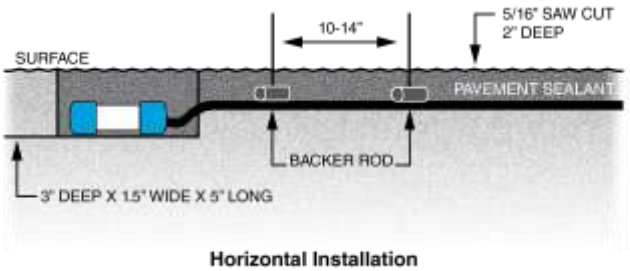
Terminal	Description	Un-shielded Cable	Shielded Cable
1	Power (12 – 24 VDC/VAC)	-	-
2	Power (12 – 24 VDC/VAC)	-	-
3	Relay - NO	-	-
4	Relay - COM	-	-
5	Relay - NC	-	-
6	Open collector through-put	BROWN	WHITE
7	Open collector through-put		
8	Sensor communications A	RED	RED
9	Sensor communications B	GREEN	GREEN
10	V+ (to sensor)	WHITE	BROWN
11	V- (logic common)	BLACK	BLUE

Troubleshooting

Symptom	Possible cause	Solution
Green LED flashes	Communication failure	1. Check communications and power wiring to sensor module 2. Cycle power to remote and sensor module
Green LED flashes, 1 fast	Previous communication failure	Check communications and power wiring to sensor module
No detection	Sensitivity set too low	With vehicle within desired proximity, observe ULTRAMETER™ display, set sensitivity to the level indicated on the display
Green and red LED's flash	Insufficient supply voltage	Make sure the power supply is working correctly and properly rated according to connections table (see above)

HORIZONTAL INSTALLATION

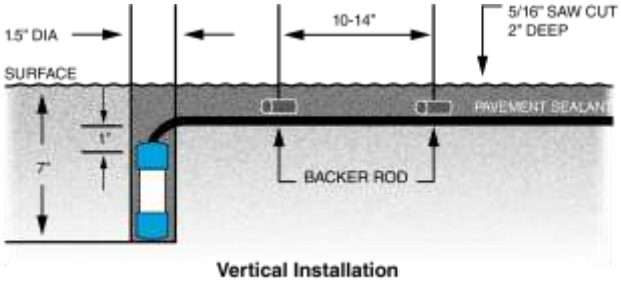
Horizontal installation can be accomplished by cutting out a 3” x 1.5” x 5” area in the pavement, with a 5/16” x 2” deep saw cut exiting the cutout for the communications/power cable. Backer rod should be place at a minimum of every 10-14”. Pavement sealant can then be used to fill the cable and probe cavities.



Horizontal Installation

VERTICAL INSTALLATION

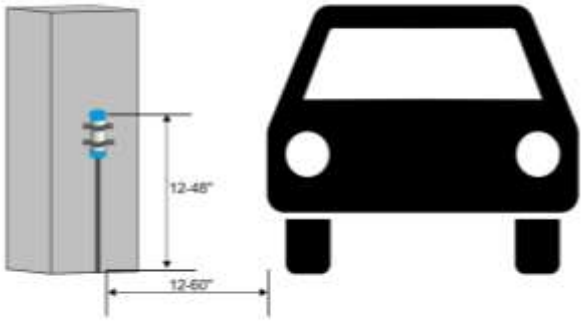
For vertical installation, drill a 7” x 1.5” hole in the surface with a 5/16” x 2” deep saw cut exiting the cutout for the communications/power cable. Backer rod should be place at a minimum of every 10-14”. Pavement sealant can then be used to fill the cable and probe cavities.



Vertical Installation

ABOVE-GRADE MOUNTING

When mounting above-grade, make sure that the probe is placed at a height to maximize the sensitivity of the detector. This typically means installing it at door level to prevent dropouts. The maximum distance maintained between the probe and the vehicle should be less than five feet (see CS303 Sensitivity vs. Distance graph on the following page).



Above-Grade Installation

The probe should be secured to the target object to minimize any movement that might provide false detections or dropouts. Securing may be accomplished with at least one 1” ID pipe/conduit strap, such as Cantex part number 5133736. If plastic straps are not available, steel may be used, but should be placed towards the cable-end of the probe to avoid sensitivity related issues.

The probe can be installed inside of any non-ferrous architectural structures, such as fiberglass, plastic, aluminum, etc.

Probe cabling should be enclosed in conduit to minimize environmental degradation.

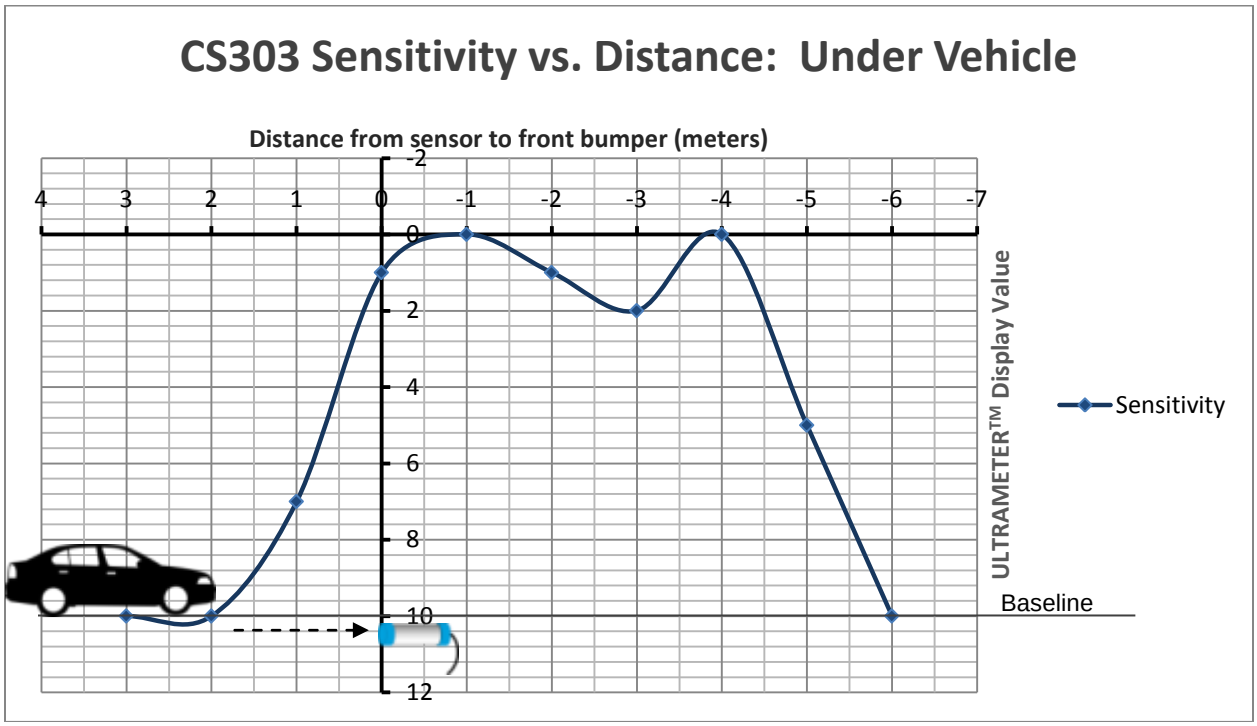


Figure 1 - CS303 Sensitivity Data

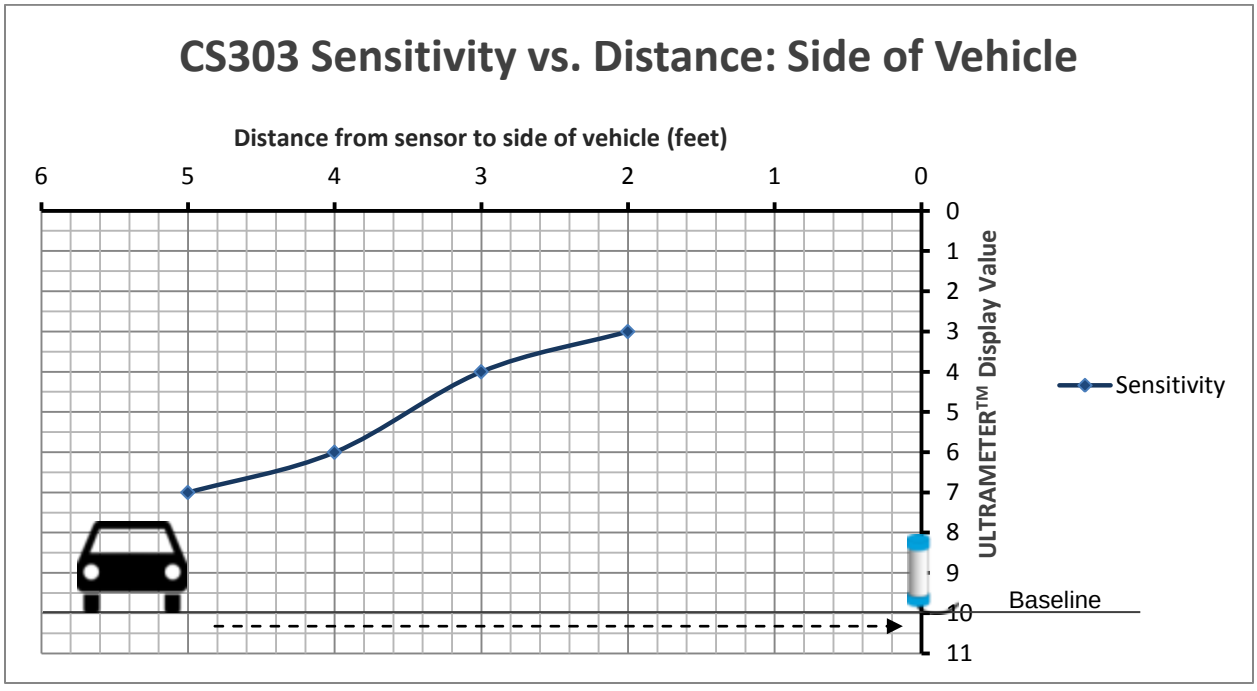


Figure 2 - CS303 Sensitivity Data

Ordering Information

- **CS303-C-1** – Control unit
- **CS303-DB-50** – 50’ direct burial sensor
- **CS303-DB-100** – 100’ direct burial sensor

Warranty

EMX Industries Incorporated warrants all products to be free of defects in materials and workmanship for a period of two years under normal use and service from the date of sale to our customer. This warranty does not cover normal wear and tear, abuse, misuse, overloading, altered products, damage caused by incorrect connections, lightning damage, or use other than intended design.

There is no warranty of merchantability. There are no warranties expressed or implied or any affirmation of fact or representation except as set forth herein.

EMX Industries Inc. sole responsibility and liability, and the purchaser’s exclusive remedy shall be limited to the repair or replacement at EMX Industries option of a part or parts found not conforming to the warranty. In no event shall EMX Industries Inc. be liable for damages, including but not limited to damages resulting from non-conformity, defect in material or workmanship.

Effective date: January 1st, 2002

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Revision 1.4
9.10.2015