CarSense 202

Vehicle Motion Detector

Instruction Manual

The CarSense 202 is a compact, single-piece, vehicle motion detector that operates by detecting changes in the earth's magnetic field that occur near the probe with a fixed detection range of 12ft. at a vehicle speed of 5 mph. The CS202 will only detect a moving vehicle and will not detect a stationary vehicle. The CS202 may be used as a free exit sensor to allow gates to open and guests to exit without the use of a key fob or passcode. The CS202 may also be wired to notify a home automation system or security system that a vehicle is moving down a driveway. This vehicle motion detector is available in 50, 100, or 150ft. lead lengths.

Cautions and Warnings

The CS202 is designed to detect moving vehicles. It is not suitable for use as a vehicle presence detector such as a reversing loop for a gate or door.

The CS202 detects ferrous metals. It will not detect aluminum but will detect any moving ferrous metallic object.

The probe must be stationary to function properly.

Specifications

Power	9 - 41VDC or 6 - 29VAC
Standby current	0.250mA
Detection current	12mA
Range sensitivity	12ft. @ 5 mph min. speed
Output on time	Approximately 1 second
Surge protection	Probe input circuitry protected by surge suppressors
Relay output configuration	Form C (SPDT)
Relay contact rating	1A @ 24VDC 1A @ 120VAC
Operating temperature	-40° to 82°C (-40° to 180°F) 0 to 95% relative humidity
Probe housing material	PVC watertight
Probe dimensions (L x Dia.)	24" (610 mm) x 1" (25 mm)
Probe cable	5-wire, direct burial

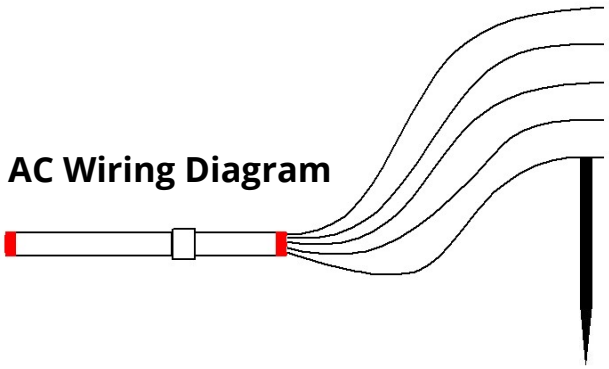
Accessories for CS202

- CS202S-5W-50 CarSense 202 5-wire, 50ft. lead-in wire
- CS202S-5W-100 CarSense 202 5-wire, 100ft. lead-in wire
- CS202S-5W-XX CarSense 202 5-wire, (enter required length in ft.) lead-in wire

Wiring Connections

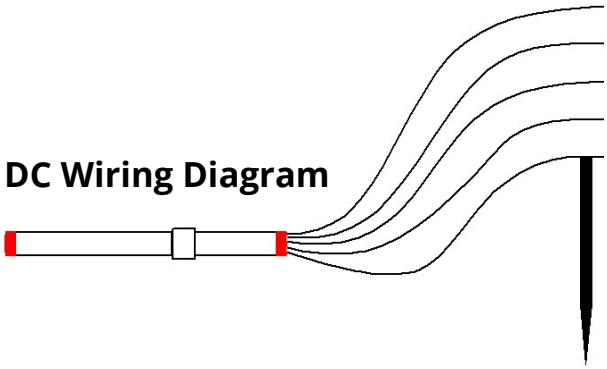
Wire Color	Description
Red	Power + (9 to 41VDC or 6 to 29VAC)
Black	Power – (9 to 41VDC or 6 to 29VAC)
Green	Common (relay common contact)
White	N.C. (relay normally closed contact)
Brown	N.O. (relay normally open contact)

AC Wiring Diagram



Red	Power + (6 to 29VAC)
Black	Power – (6 to 29VAC)
White	N.C. (relay normally closed contact)
Brown	N.O. (relay normally open contact)
Green	Common (relay common contact) and earth ground

DC Wiring Diagram



White	N.C. (relay normally closed contact)
Brown	N.O. (relay normally open contact)
Green	Common (relay common contact)
Red	Power + (9 to 41VDC)
Black	Power – (9 to 41VDC) and earth ground

IMPORTANT: EARTH GROUND CONNECTION

The CS202 contains transient protection devices to guard the sensitive electronic circuitry from damage and false triggering due to electrical transients caused by lightning or other sources. Always provide a good earth ground. An 8ft. copper rod or metal cold-water pipe provides a sufficient earth ground connection.

When using **AC power**, connect the CS202 green common relay and earth ground wire to the operator.

When using **DC power**, connect the CS202 black power (–) wire and the operator's ground, common or power (–) lead to the earth ground.

Installation

Determine the location of where you intend to install the probe.

Read the following list of tips prior to beginning the installation process.
This will save you significant time in the long run.

- The detector's sensitivity is a function of speed and mass. The detection distance for a moving, average size car or truck is approximately 12ft. at a speed of 5 mph. At higher speeds, detection distance can exceed 12ft. as noted below.

Size of Moving Vehicle	Speed	Detection Distance
Average size car or truck	5 mph min.	12ft.
Average size car or truck	10-50 mph	Greater than 12ft.
Large truck or semi-truck	Over 50 mph	Greater than 40ft.
Train	Any	100ft.

- The detector is sensitive to minute changes in the magnetic field around the probe. Power lines, transformers, and other electrical devices located in the vicinity of the probe that produce transients could cause disturbances in the magnetic field that may result in triggering the detector. Avoid installation of the probe near these devices.

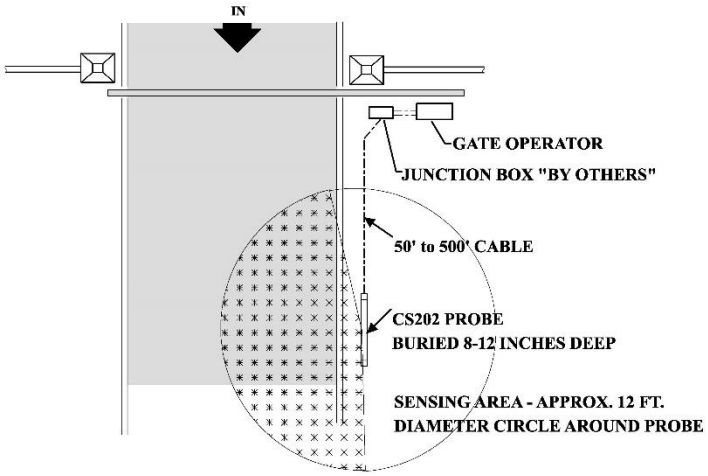
- Do not install the probe or lead wire near or parallel to:
    - Low voltage lighting wires or in-ground power lines
    - Telephone lines or intercom systems
    - Electric motors or control relays
    - Overhead power lines, transformers or underground power lines
    - Cell phone towers, TV towers or communications links
    - Moving metal flagpoles, fences, gates or horses with metal shoes

- Do not mount on any moving surface, such as bridges or walkways that may vibrate under traffic. The probe must always be installed in such a way that it remains completely motionless. Any movement will cause the probe to trigger.

- Probes are available in various cable lengths, when possible select the appropriate cable length for the installation. If it is necessary to extend the cable length (maximum 900 ft), use a high-quality lead-in cable suitable for direct burial, and a high quality, watertight cable splice to prevent moisture from entering the cable causing false triggering. Lead-in wire is available from EMX.

- When there is a high incidence of damage from burrowing animals or other potential damaging activities, it is recommended that the cable be placed in plastic conduit (1.5" internal diameter) to prevent damage to the cable. Damage to the cable jacket may allow moisture to enter the cable causing false triggering. When placing the probe in plastic conduit, use foam or tape to assure that the probe does not move or vibrate. It is recommended that the conduit be sealed to prevent water from collecting in the conduit.

Installation Methods

<table>
<tr><th>Adjacent to Roadway (Recommended Method)</th><th>In a Roadway</th></tr>
<tr><td>1. Temporarily place the probe parallel to the roadway (driveway) in the desired location.
 
</td><td>1. Position the probe in the center of the roadway, perpendicular to the direction of traffic. The probe should be located approximately 2″ deep in concrete or asphalt.

TIPS:

• If installing the probe prior to paving a hot asphalt roadway, the CS202 and its lead cable need to be insulated. A common method to do this would be to dig a small trench and bury the probe and lead cable in 4″ of sand prior to paving. (DO NOT APPLY HOT ASPHAULT DIRECTLY AGAINST PROBE AND LEAD CABLE!)
• If installing probe in concrete, make sure that probe is installed above the rebar.
• The probe may be located prior to paving, or a cut may be made in the finished pavement for installation.</td></tr>
<tr><td colspan="2">2. Connect the power, output relay contact and earth ground to the intended equipment. (Reference EARTH GROUND CONNECTION in the WIRING CONNECTIONS section.) DO NOT EXCEED 41VDC or 29VAC.</td></tr>
<tr><td colspan="2">3. Apply power and allow 5 minutes of warm-up for system stabilization.</td></tr>
<tr><td colspan="2">4. Drive a vehicle at a minimum speed of 5 mph past the probe and to the far side of the roadway. Upon detection of the moving vehicle, the output relay will energize for approximately 2 seconds. Verify that the CS202 has detected the moving vehicle.</td></tr>
<tr><td>5. Bury the probe at this location approximately 8-12″ deep for typical applications. Repeat the previous sensitivity check (step 4-5) to verify proper operation. Installation adjacent to roadway complete.</td><td>5. Installation in roadway complete.</td></tr>
<tr><td colspan="2">TIP: For instances of high pedestrian traffic, heavy animals or heavy vehicles, bury the probe 24″ deep to prevent false triggering in either installation method.</td></tr>
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Troubleshooting

Symptom	Possible cause	Solution
False triggering	- Electrical disturbances - Damaged probe cable - Moisture in probe cable - Movement in the probe's environment - Dirty or noisy power supply	1. Disconnect from operator power supply, temporarily connect the red and black wires to a 9 or 12V battery. Wait 5 minutes for the system to stabilize. If the false triggering stops, consider using a separate power supply for the CS202 such as a 120VAC to 12VDC power converter (min. 100ma). 2. Disconnect the relay wires and see if the false triggering continues. If the false triggering stops, switch the brown and green wires in the operator and/or add earth ground connection to COM input in operator. Verify that the earth ground is connected securely. If the connection is not secure, reconnect the earth ground and retest the system. 3. Inspect the area around the probe to see if any metallic objects may be subject to any movement. These may include fences, flagpoles, signs, etc. Other possible causes are electrical power lines, electric motors, invisible dog fences, low voltage lighting and high-power lighting.
No detection	- Minimum 5 mph - Bad wire connection - Faulty power connection - Failed relay	1. Disconnect the output contacts from the operator. 2. Connect a digital multi-meter, set to read ohms, to the CS202 internal relay COM and N.O. contacts. The meter should read open (infinity). Move a metal tool over the length of the probe. Verify that the meter reads less than 10 ohms. If the meter reads more than 10 ohms, the CS202 is defective. 3. Check the supply voltage using a digital multi-meter. Verify the voltage is 9 – 41 VDC or 6 – 29 VAC.

Warranty

EMX Industries, Inc. products have a warranty against defects in materials and workmanship for a period of two years from date of sale to our customer.