



VMD202

VEHICLE MOTION DETECTOR

The VMD202 vehicle motion detector senses moving ferrous metal within its magnetic field. It has a detection range up to 3.5 m at a minimum speed of 8 km/hr. An optional sensitivity remote finely tunes the VMD202 to fit any installation requirement and then easily detaches to prevent unwanted changes or tampering. The settings are stored in a non-volatile memory, saving them in case of power failure. The VMD202 accepts a wide range of power inputs from 12-39 VDC or 12-27 VAC and features a low current consumption (70 uA standby / 25 mA activated) making it ideal for solar applications.

VMD202



Vehicle Motion Detector

- The probe assembly and cable are water tight and direct burial compatible.
- An optional remote can be connected via screw terminals to select 10 sensitivity settings.
- The detection range is up to 3.5 m at a minimum speed of 8 km/hr.



VMD202



VMD202-R

Technical Data

Power	12-39 VDC or 12-27 VAC
Current	70 uA standby / 25 mA activated
Relay	Form C (SPDT) 1A@24 VDC; 1A@120 VAC
Operating Temperature	-30°C to 70°C (-22° to 158°F) 0 to 95% relative humidity
Material	ABS plastic for VMD202-R, PVC for probe
Remote Dimensions	VMD202-R 2.9" (74 mm) x 1.7" (35 mm) x 0.6" (15 mm)
Probe Dimensions (L x Dia.)	VDM202 24" (610 mm) x 1" (25 mm)
Probe Cable	5 wire direct burial PVC

Ordering Information

- VMD202-15 Prop with 15m of cable
- VMD202-R Remote for tuning and adjustment control

WARRANTY EMX INC. the product described herein for a period of 2 years under normal use and service from the date of sale to our customer. The product will be free from defects in material and workmanship. This warranty does not cover ordinary wear and tear, abuse, misuse, overloading, altered products, or damage caused by the purchaser from incorrect connections, or lightning damage. There is no warranty of merchantability. There are no warranties expressed, implied, or any affirmation of fact or representation which extend beyond the description set forth herein. EMX Inc. sole responsibility and liability, and the purchaser's exclusive remedy shall be limited to the repair or replacement at EMX's option of a part or parts not so conforming to the warranty. In no event shall EMX Inc. be liable for damages of any nature, including incidental or consequential damages, including but, not limited to any damages resulting from non-conformity defects in material or workmanship. **Rev 1.3 01/04/2021**





VMD202™

Single Piece Vehicle Motion Detector
And Sensitivity Remote



Instruction Manual

The VMD202 is a compact, single-piece vehicle motion detector that operates by detecting changes in the earth's magnetic field that occur near the probe. It has a detection range of up to 3.5m at a Minimum Speed of 8 km/h. The VMD202 will only detect a moving vehicle and will not detect a stationary vehicle. It 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 VMD202 may also be wired to notify a home automation system or security system that a vehicle is moving down a driveway.

Cautions and Warnings



The VMD202 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 VMD202 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

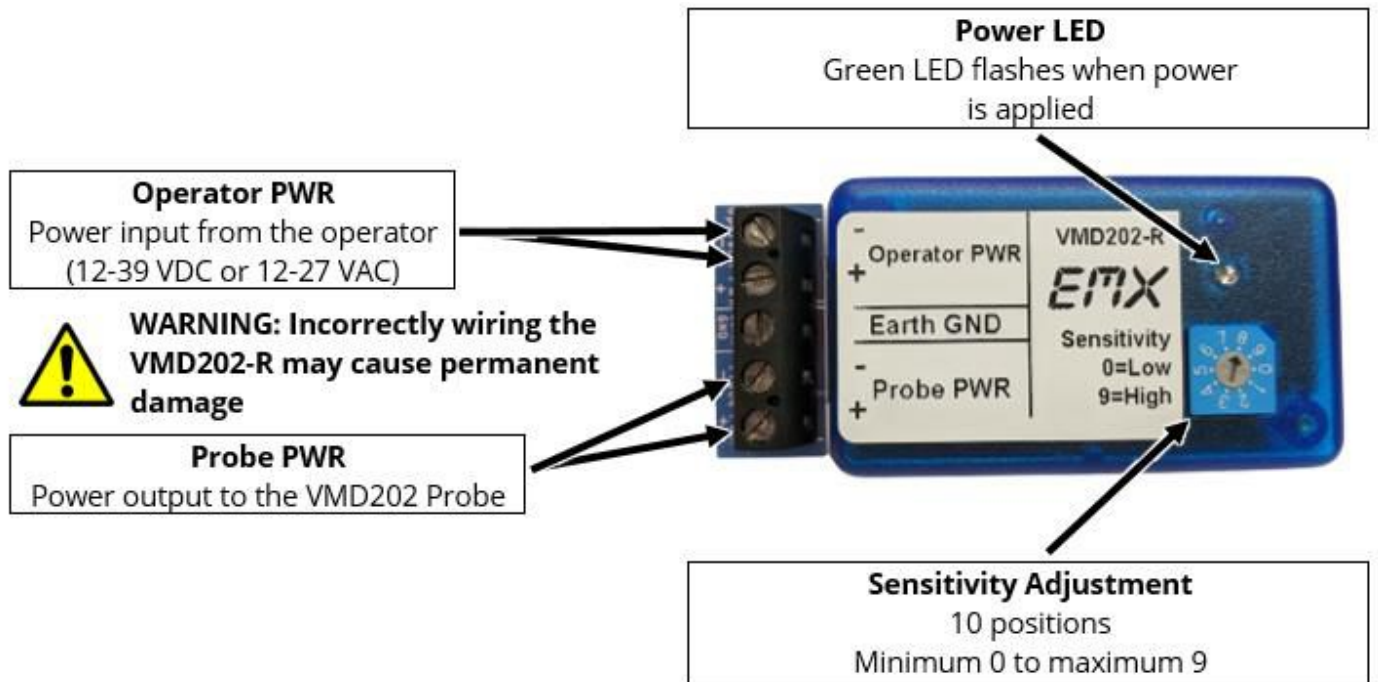
Power	12-39 VDC or 12-27 VAC
Power Indicator	Green LED (Sensitivity Remote Only)
Standby Current	70 uA
Detection Current	25 mA
Range Sensitivity	12 ft @ 5 mph min. speed
Sensitivity Adjustment	10 settings
Output Time	5 seconds
Surge Protection	Probe input circuitry protected by surge suppressors
Relay Output Configuration	Form C (SPDT)
Relay Contact Rating	1 A @ 24 VDC / 1 A @ 120 VAC
Operating Temperature	-30 °C to 70 °C (-22 ° to 158 ° F) 0 to 95% relative humidity
Remote Housing Material	ABS plastic
Remote Dimensions (L x W x H)	2.9" (74 mm) x 1.7" (35 mm) x 0.6" (15 mm)
Remote Weight	0.05 lbs (23 g)
Probe Housing Material	PVC watertight
Probe Dimensions (L x Dia.)	24" (610 mm) x 1" (25 mm)
Probe Cable	5-wire, direct burial

Ordering Information

VMD202-15 - Advanced Gate Automation Vehicle Motion Detector with 15m Cable

Vehicle Motion Detector VMD202 with 15m Cable and **VMD202-R** Sensitivity Remote Suitable for 12-39 VDC / 12-27 VAC and Solar Power Applications

Controls and Indicators



TIP: Sensitivity is a function of speed and mass. The smaller a vehicle is and the slower it is moving, the closer it must pass the probe to trigger the detector.

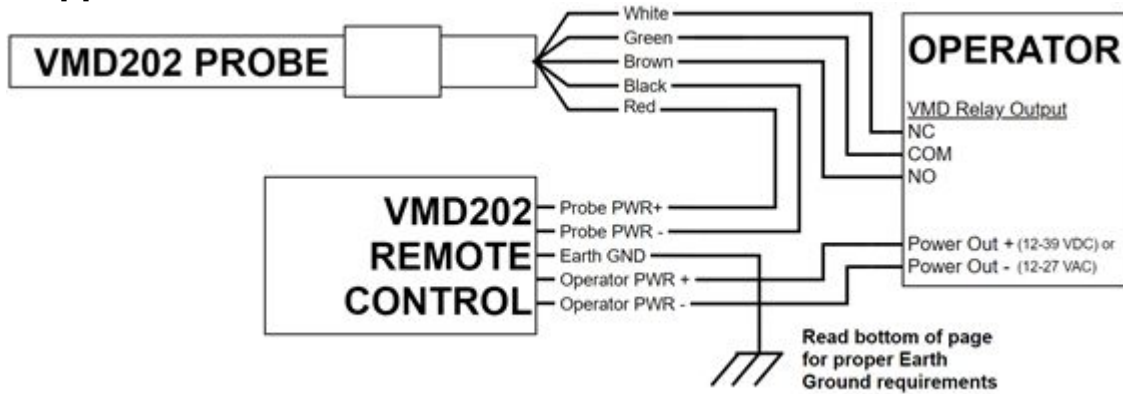
Wiring Connections

Probe Connections	
Wire Color	Description
Red	Power + (12-39 VDC or 12-27 VAC)
Black	Power - (12-39 VDC or 12-27 VAC)
Green	Relay - COM (common contact)
White	Relay - NC (normally closed contact)
Brown	Relay - NO (normally open contact)

Remote Connections	
Terminal	Description
Probe PWR +	Power out to probe (Probe Red Wire)
Probe PWR -	Power out to probe (Probe Black Wire)
Earth GND	Earth ground connection
Operator PWR +	Power in from operator (12-39 VDC or 12-27 VAC)
Operator PWR -	Power in from operator (12-39 VDC or 12-27 VAC)

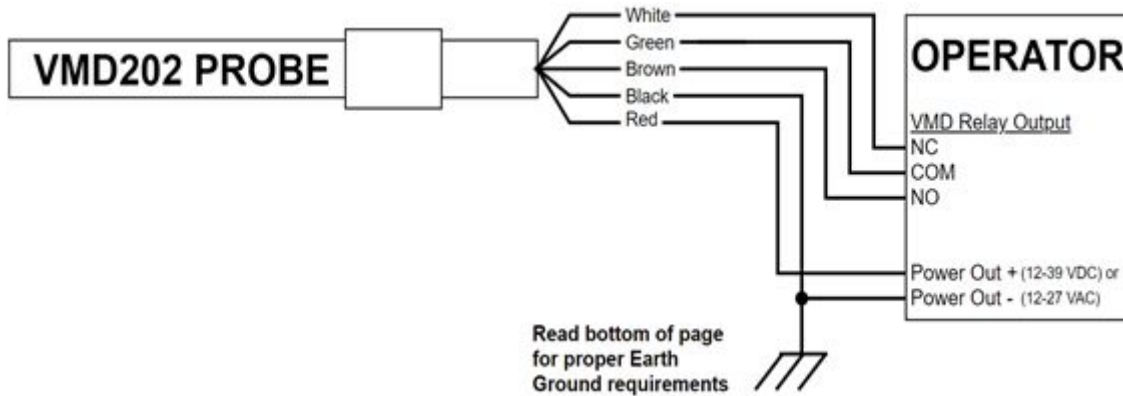
Applications

Standard Applications:



Solar Applications:

The remote control is removed to minimize power consumption.



IMPORTANT: EARTH GROUND CONNECTION

The VMD202 contains protection devices to guard against damage and false triggering due to electrical transients caused by lightning or other sources. Always provide a good earth-ground connection to the green wire of the VMD202 remote control in standard applications or the black wire of the VMD202 probe in solar applications. A 20cm copper rod or metal cold-water pipe provides a sufficient earth-ground connection.

SOLAR NOTE: The probe consumes only 70 uA when no vehicle motion is detected and draws a higher current for 5 seconds when detecting vehicle motion. This table provides an average current draw based on an estimate of how many cars per day may activate the VMD202. Connect the remote to the probe to adjust the sensitivity, then remove the remote and power the probe directly from the operator (the remote draws extra current). A 12 VDC battery is recommended for solar applications (a 24 VDC battery can be used as well).

*Values are without remote connected

Number of Vehicle Activations Per Day	Average Current (Amps)
720	0.001442
288	0.000619
144	0.000344
72	0.000207
48	0.000161

Installation

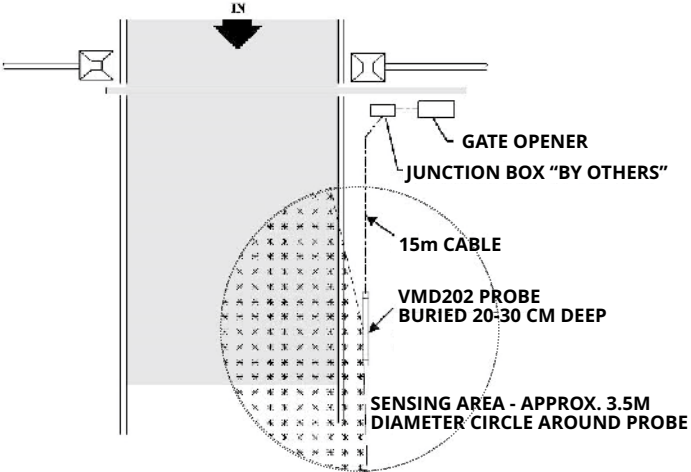
Read the following list of tips prior to beginning the installation process.
This will save significant time in the long run.

- The detector's sensitivity is a function of speed and mass. The detection distance for a moving, average size car or truck is approximately 3.5 m at a speed of 8 km/hr. At higher speeds, the detection distance can exceed 3.5 m as noted below.

Size of Moving Vehicle	Speed	Detection Distance
Average size car or truck	8 km/hr min.	Up to 30 cm
Average size car or truck	16-80 km/hr	Greater than 30 cm
Large truck or semi-truck	Over 80 km/hr	Greater than 1 m
Train	Any	2.5 m

- 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 15 m) 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 (3.8 cm internal diameter) 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 it.

Installation Methods

Adjacent to Roadway (Recommended Method)	In a Roadway
<p>1. Temporarily place the probe parallel to the roadway (driveway) in the desired location.</p>  <p>The diagram illustrates the 'Adjacent to Roadway' installation method. It shows a gate opener connected to a junction box labeled 'BY OTHERS'. A 15m cable runs from the junction box to a VMD202 probe buried 20-30 cm deep in the ground. A circular sensing area of approximately 3.5m diameter is centered on the probe. An arrow labeled 'IN' points towards the roadway.</p>	<p>1. Position the probe in the center of the roadway, perpendicular to the direction of traffic. The probe should be located at a minimum of 5cm deep in concrete or asphalt.</p> <p>TIP:</p> <ul style="list-style-type: none"> If installing the probe prior to paving a hot asphalt roadway, the VMD202 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 10cm of sand prior to paving. (DO NOT APPLY HOT ASPHALT DIRECTLY AGAINST PROBE AND LEAD CABLE!) If installing the probe in concrete, make sure it is installed above the rebar. The probe may be positioned prior to paving or a cut may be made in the finished pavement for installation.
<p>2. Connect the power, VMD202 remote control, output relay contact and earth ground to the intended equipment. (Reference EARTH GROUND CONNECTION in Wiring Connections.) DO NOT EXCEED 39 VDC or 27 VAC.</p>	
<p>3. Apply power and allow 5 minutes of warm-up for system stabilization.</p>	
<p>4. Set sensitivity to 0.</p>	
<p>5. Drive a vehicle at a minimum speed of 8 km/hr passed the probe and to the far side of the roadway.</p>	
<p>6. Repeat step 5 while gradually increasing the sensitivity until the system detects the vehicle.</p> <p>TIP:</p> <ul style="list-style-type: none"> A higher sensitivity setting than required to detect the vehicle makes the system more vulnerable to triggering from unintended sources such as movement of other objects, including bicycles, horses, small vehicles, metal in shoes or other electrical disturbances. When the detector is set to maximum sensitivity (full counterclockwise on the sensitivity adjustment) detection distance is approximately 3.5m at a speed of 8 km/hr. At higher speeds, 15-20 km/hr, detection distance can exceed 3.5m. 	
<p>7. Bury the probe at this location approximately 20-25 cm deep for typical applications. Repeat the previous sensitivity check (steps 4-5) to verify proper operation. Installation is adjacent to roadway complete.</p>	<p>7. Installation in roadway complete.</p>
<p>TIP: For instances of high pedestrian traffic, heavy animals or heavy vehicles, bury the probe 60 cm deep to prevent false triggering in either installation method.</p>	

Troubleshooting

Symptom	Possible Cause	Solution
False triggering	<p>Electrical disturbances</p> <p>Damaged probe cable</p> <p>Moisture in probe cable</p> <p>Movement in the probe's environment</p> <p>Dirty or noisy power supply</p> <p>Lightning</p> <p>Low Input Voltage</p>	<ol style="list-style-type: none"> 1. Verify that the earth ground connection to the VMD202 is secure. If the connection is not secure, reconnect both the VMD202 and the earth ground and retest the system. 2. Disconnect the relay wires (green, white, brown) and see if the false triggering continues. If the false triggering stops, check the probe as outlined below in step 3. If the false triggering continues, disconnect the power and temporarily connect a 12V battery to the VMD202 and reconnect the probe. Wait 5 minutes for the system to stabilize. If the false triggering stops, consider using a separate power supply for the VMD202 such as a 120 VAC to 12 VDC power converter (min. 100 ma). Reconnect the probe and retest the system. 3. Inspect the area around the probe to see if any ferrous metal 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 output	<p>Bad wire connection</p> <p>Failed relay</p>	<ol style="list-style-type: none"> 1. Disconnect the output contacts from the operator. 2. Connect a digital multimeter, set to read ohms, to the COM and NO contacts. The meter should read open (infinity, or "OL"). 3. 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 VMD202 is defective.
No detection	<p>Minimum 8 km/hr</p> <p>Bad wire connection</p> <p>Faulty power connection</p> <p>Failed relay</p>	<ol style="list-style-type: none"> 1. Verify that the VMD202 remote control's green LED is on. If not, check the supply voltage using a digital multimeter. Verify the voltage is 12-39 VDC or 12-27 VAC. 2. If voltage is present and there is still no detection, the VMD202 is defective.

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.



VMD202™

Single Piece Vehicle Motion Detector
Sensitivity Remote



Guide: Removing VMD202 Probe Harness for Remote w/ Terminals

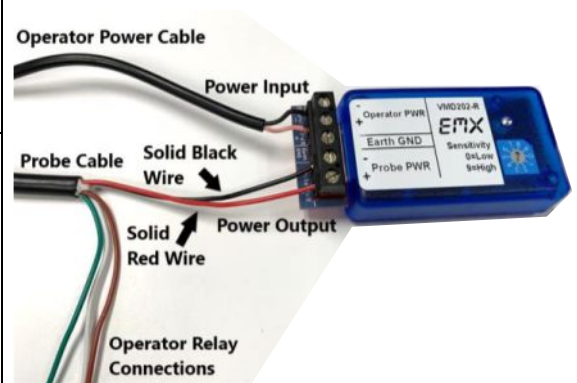
Required Tools: Wire strippers, small flat-head screwdriver

Wiring to Remote and Operator

- Wire the **Red (Probe PWR +)** and **Black (Probe PWR -)** wires from the probe cable into the two remote screw terminals labeled **"Probe PWR"**.
- Wire the probe relay wires (**Green=COM, White=NC, Brown=NO**) to the operator input terminals. See the operator's manual for wiring instructions.
- Wire power (12-39 VDC / 12-27 VAC) from the operator into the remote terminals labeled **"Operator PWR"**. Ensure power is wired in with the correct polarity. **Incorrect wiring can cause permanent damage to the remote.** The operator power cable is not provided with the VMD202 system.

- If the remote is going to permanently be part of the installation, connect an earth ground to the remote terminal labeled **"Earth GND"**.

- The image to the right shows how the final wiring should look. If you intend to use the VMD202 without the remote, use the table below for connections to the probe cable.



Final Wiring to the VMD202 Remote

Probe Connections	
Wire Color	Description
Red	Power + (12-39 VDC or 12-27 VAC)
Black	Power - (12-39 VDC or 12-27 VAC)
Green	Relay - COM (common contact)
White	Relay - NC (normally closed contact)
Brown	Relay - NO (normally open contact)