Decatur electronics

A SONCELL NA COMPANY

Genesis VP Directional™

User's Manual

Canada Variant • Rev 25/Aug/2010

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This manual is the most current version and supersedes all other manuals.

SONCELL NORTH AMERICA
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5. Performance Tips

Understanding potential radar interference and what to do when it occurs can greatly increase the radar's performance.

5.1 How Radar Works

Determining a vehicle's speed begins with the radar gun transmitting a beam of microwave energy (radio waves) at an approaching or departing target vehicle. When energy from this beam strikes a vehicle, a small amount of the beam is reflected back to the antenna. The reflected signal frequency shifts by an amount proportional to the speed of the target vehicle. This is known as the Doppler effect. The radar device then determines the target vehicle speed from the difference in frequency between the reflected and transmitted signal.

5.2 Interference Sources

When properly installed and operated, Doppler radar technology is accurate and reliable. However, variations in the environment can cause situations and circumstances which can cause spurious responses which are readily identified by a qualified operator. Signs that a speed is spurious can include the following characteristics:

- A valid target motor vehicle speed in the operational range will always override the source of interference and will be confirmed by the audio component. (See Sections 5.2.2 through 5.2.7.)
- The Doppler tone will lack the pitch and clarity component..
- Speeds are irregular.
- Speeds appear to track with the engine speeds.

5.2.1 Angular Interference (Cosine Effect)

The Cosine Effect causes the system to display a speed which is lower than the actual vehicle speed. This condition occurs when the targeted motor vehicle's path is not parallel to the antenna, including conditions such as the motor vehicle traveling on a curve or a hill.

As the angle between the beam of the antenna and the targeted motor vehicle increases, the displayed speed decreases. Ideally, an angle of zero degrees (0°) is preferable, because the displayed speed is the actual targeted motor vehicle speed. However, in all uses of police radar, the radar device is always at a slight angle to the targeted motor vehicle to avoid collisions.

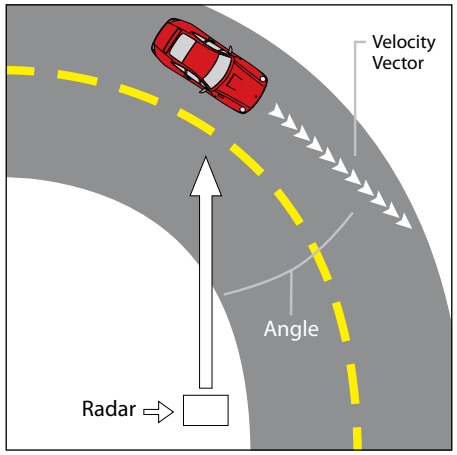

Figure 5.2.1a
An angle between the antenna and the target vehicle causes the cosine effect.

The following table shows the effect that an increasing angle has on a displayed speed.

Actual Speed	Horizontal Angle Degrees: 0°	1°	3°	5°	10°	15°	20°	30°	45°	60°	90°
	Displayed speed:										
50 km/h	50	49	49	49	49	48	46	43	35	25	0
65 km/h	65	64	64	64	64	62	61	56	45	32	0
80 km/h	80	79	79	79	79	77	74	69	56	40	0
90 km/h	90	89	89	89	88	86	84	77	63	45	0
100 km/h	100	99	99	99	98	96	93	86	70	50	0
110 km/h	110	109	109	109	108	106	103	95	77	55	0

Table 5.2.1b
Actual and displayed speeds at different antenna-to-target angles.

Small angles (less than 10°) have little effect on accuracy. As the angle increases, the displayed speed decreases. At 90°, the target speed is 0—grossly incorrect. Cosine Effect will always result in a target speed being displayed that is less than the actual speed of the moving motor vehicle, which will always be advantageous to the motorist.

5.2.2 Fan Interference

Fan interference is the most common form of interference that you are likely to experience. It is caused when the radar measures the speed of the vehicle blower fan. Changing the fan speed causes a proportional change in the display speed.

5.2.3 Electromagnetic Interference (EMI)

Operating electric motors can produce EMI. With the DSP algorithms the Genesis-VPD has eliminated this.

5.2.4 Feedback Interference

When the radar beam is directed at computer screens, streetlights, and other electronic devices, it can display spurious speeds. To correct the interference, relocate the radar gun antenna.

5.2.5 Multi-Path Beam Cancellation

The Genesis-VPD is immune from multi-path cancellation.

5.2.6 Radio Frequency Interference (RFI)

The Genesis-VPD contains an RFI detection circuit that detects excess radio frequency energy. When stray radio frequency energy reaches an excessive level, the system displays an RFI message and stops processing and displaying speeds. The system resumes normal operation when the RFI condition no longer exists. At that time, any locked speeds will display again.

5.2.7 Scanning

The Genesis-VPD is designed to be used while attached to a solid mount or hand-held in a steady position. Moving or "scanning" the antenna past stationary objects can cause the system to detect

motion. Obtaining a speed reading from scanning will not happen when you properly use the radar.

6. Testing the Device

6.1 Operator Requested Self Test

Pressing the TEST button initiates a comprehensive system self test, which checks the numeric displays and runs a target speed simulation. The self test checks:

DISPLAY TEST: Allows the operator to verify that the digit segments and status LED lights are working correctly and that none of the pixels in the number segments are burned out.

CIRCUITRY TEST: The system checks the internal circuitry. If the unit passes all internal checks, the messages PASS will be displayed. If an error should occur then FAIL will appear in the display window.

SPEED SIMULATION TEST: The radar verifies speed accuracy using synthesized Doppler frequencies corresponding to a series of four simulated speeds: 25, 50, 75, and 100 km/h.

- Section 6.1 must be completed by the officer prior to enforcement and at the conclusion of the officer's tour of duty (if any enforcement action was taken).

6.2 Mini-Test

The tSt option sets the system to automatically perform a "mini" self test every 10 minutes.

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8.5 Accuracy

The speed calculations of any radar Decatur Electronics produces are 100% accurate. The display precision is as folows:

± 1 unit of measure in stationary mode of operation

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