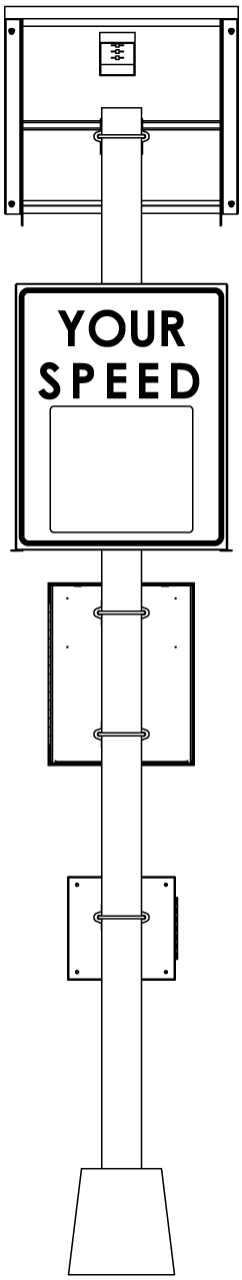
POLE-MOUNT RADAR-SPEED SIGNS

MODEL WSDP
PRODUCT SPECIFICATIONS | FEBRUARY 2022



1. SYSTEM

1.1. Description

Wanco speed signs provide vehicle speed detection and display in a pole-mounted platform that can be either hard-wired to commercial power or battery-powered with an automatic solar charging system.

Using built-in radar, the speed sign detects oncoming vehicles, then displays their speed on its full-matrix LED display panel, informing drivers of their actual speed. Formal studies have proven that speeding drivers respond by slowing down to legal limits when their actual speed is displayed on an electronic sign.

Studies also indicate that some drivers "test" radar-based speed displays by driving very fast. To address this danger, Wanco speed signs do not display excessive speed, but instead employ their full-matrix display to flash a message or symbol at drivers, to indicate they are going much too fast.

1.2. Models

1.2.1.	WSDP1-A	Pole-mount speed sign, small electronic display, commercial power
1.2.2.	WSDP1-S	Pole-mount speed sign, small electronic display, battery power & solar charging
1.2.3.	WSDP3-A	Pole-mount speed sign, large electronic display, commercial power
1.2.4.	WSDP3-S	Pole-mount speed sign, large electronic display, battery power & solar charging

1.3. Mounting

Pelco®-type mounting brackets included, with U-bolts and gaskets for a 4.5" OD pole

See "Options and Optional Equipment" for mounting options

1.4. Temperature limits

Operating temperature, –4 to 176°F (–20 to 80°C)

1.5. Standards

Compliant in accordance with:

ITE Standard, June 2007	§5.4, Electronic Noise; §5.8, Nighttime Dimming; §6.4.3, Environmental Tests
International Protection Rating	IP54
FCC	Title 47, Part 15 (47 CFR 15)

2. FEATURES

2.1. Setup

- Selectable speed limit setting
- Configurable, flashing excessive-speed message

2.2. Operation

- Electronic speed display with full matrix of LEDs
- Lenses and shades over LEDs produce superior visibility
- Permanent pole-mount at any height
- Display flashes when a vehicle exceeds speed limit
- One or two digits displayed in mph, two or three digits in km/h
- Approach-only K-band radar
- Tamper-resistant control box with cover that locks (with key) when latched

2.3. Power system

- Hard-wired to commercial power or battery-powered with solar charging system
- Energy-efficient operation
- Solar panel charges batteries automatically without intervention
- Charging system shuts down when batteries are fully charged, preventing damage
- Locking battery box prevents unauthorized access

2.4. Maintenance

- Display modules can be replaced easily
- Display cabinet door stays open during maintenance
- Durable powder-coat finish resists the elements

2.5. Application

Common applications include:

- School zones
- Residential streets
- Roadwork zones
- Rural roads

3. DISPLAY

3.1. Display behavior

0 to 50% of speed limit setting	Display is blank
> 50% to 100% of speed setting	Display shows vehicle speed
> 100% to ~130% of speed setting	Display flashes vehicle speed
> ~130% of speed setting	Display flashes configured excessive-speed message
Flash rate	> 60 cycles per minute

See Exhibit A for precise display activation speeds

3.1.1. Speed display

Units are selectable

mph	One or two digits, 5 to 99 mph
km/h	Two or three digits, 10 to 170 km/h
Font, small display	One font, 13" (33cm) high, characters vary in width
Font, large display	One bold font, 26" (66cm) high, characters vary in width

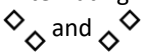
3.1.2. Excessive-speed messages

Selectable with DIP switches on systems PC board, located inside display cabinet

Can be viewed in Preview operating mode using speed limit switch on control panel

Default: SLOW DOWN (text) message

	Blank (no message)
SLOW DOWN	Slow down (text) message
☹	Frowning face symbol

	Alert symbol (exclamation point)
	Diamond symbol
	Bar symbol
	Four corners symbol
Alternating  and	Wig-wag (alternating double diamonds) symbols

3.2. Cabinet

3.2.1.	Small display	Description	Cabinet contains electronic display and system PC board
			Door on front of cabinet provides access to interior
		Size	25" x 30" x 5" (64 x 77 x 12 cm), W x H x D
		Door	Rigid door frame slides up for access to cabinet interior
			Two security screws (included) hold door closed during operation
3.2.2.	Large display	Description	Cabinet contains all electronics and controls
			Door on front of cabinet provides access to interior
			Hinged control-console door on back provides access to controls
		Size	36" x 36" x 5" (91 x 91 x 12 cm), W x H x D
		Door	Rigid door frame, hinged at top and latched at bottom, stays opens for easy maintenance; latches accept user-supplied padlocks
3.2.3.	Material	Aluminum alloy sheet, 0.06" (1.58mm) thick	
3.2.4.	Construction	Forms wrap around top, sides, back and bottom	
		Dust- and weather-resistant; not rated, comparable with NEMA 3 (IP54)	
3.2.5.	Finish	Oven-baked, white powder-coat finish to ensure durability and corrosion protection. Assemblies are run through a five-stage, high-pressure phosphate-wash prior to application of the finish coat.	
3.2.6.	Window	Clear polycarbonate resin thermoplastic window installed in door frame, UV-resistant, anti-glare surface, 0.150" thick	
3.2.7.	“YOUR SPEED” sign	Small display	Type 3 high-intensity reflective sheeting, permanently adhered to front door panel
		Large display	Type 3 high-intensity reflective sheeting, attached to front door panel with five bolts

3.3.	Display matrix		
3.3.1.	Display modules	Small display	One display module
		Large display	Four display modules; any module can be installed in any position in the matrix without repositioning DIP switches
		Wiring	Modules have quick-connect electrical connectors for easy servicing
		Replacement	Each module can be exchanged in less than two minutes with a 5/16-inch nut driver socket or slotted screwdriver
			After a new module is installed, a one-step initialization process causes each module to sense its position in the full-matrix display
		Firmware	A program chip is socket replaceable for easy firmware upgrades
		Size	16.0" (40.6cm) wide by 13.13" (33.3cm) high, nominal
		Material	FR4 glass-reinforced epoxy laminate, double-sided, black solder mask with white silkscreen
			Board thickness, 0.094" (2.388mm)
			Copper size, 1 oz. (28.4g)
		Coating	5-mil, military-spec, low-VOC, silicone conformal coating (Dow Corning 1-2577) provides long-term protection against moisture and other atmospheric contaminants, resists corrosion and shorts due to high humidity
		Vibration mounts	All display modules are mounted on rubber vibration-isolation mounts, decreasing risk of physical shock during transport and isolating characters from chassis ground
		Temperature limits	–40 to 176°F (–40 to 80°C)
		Humidity limits	Conformal coating rated to 95% relative humidity
3.3.2.	LEDs	Technology	AlInGaP II (aluminum indium gallium phosphide) technology, T-1¾ size, through-hole auto-insertion
		Color range	Amber, 589.5 to 592.0 nm
		Current	100 mA peak-pulsed forward current
		Temperature limits	Operating temperature, –40 to 212°F (–40 to 100°C)
3.3.3.	Pixels	Description	Two LEDs form a “pixel”
		Display module	12 x 10 pixels (W x H), 120 pixels total

		Full matrix	Small display	12 x 10 pixels (W x H), 120 pixels total
			Large display	24 x 20 pixels (W x H), 480 pixels total
		Pixel size	0.75" x 0.75" (19 x 19mm)	
		Pixel pitch	34mm, horizontal and vertical	
3.3.4.	Lenses and visors	Each pixel has a snap-in optical lens over the LEDs, enhancing the brightness and angularity of each pixel while reducing power consumption. A polycarbonate visor shades each row of pixels to eliminate glare caused by direct sun exposure. The sunshades snap onto the display module without tools. The lenses snap into the sunshades. These enhancements enable the speed display to conserve power and operate with high efficiency.		
3.3.5.	Viewing angle	Total viewing area with optical lenses, 50 degrees		
3.3.6.	Brightness	Factory preset for optimal visibility and power consumption		
3.3.7.	Auto dimming	Two photocells detect ambient light on the speed display; the system automatically adjusts the brightness of the LEDs accordingly, dimming display brightness in darkness, increasing to full brightness in daylight Photocells are mounted inside the display cabinet, one facing rear and one facing front Auto dimming is unaffected by temporary light sources such as vehicle headlights		
3.3.8.	Software design	Driver	LEDs controlled through 30mA pulse-width modulation design	
		Addressing	Each display module address is selected through a software command; no DIP switches are used. The address does not change until reprogrammed.	

4. CONTROL CONSOLE

4.1.	Location	Small display	Weather-resistant control box with hinged control console door. Two key-operated latches keep door locked when latched. Enclosure: Aluminum alloy sheet, 0.06" (1.58mm) thick
		Large display	Back of speed display box, inside weather-resistant compartment, behind a hinged control console door. Two key-operated latches keep door locked when latched.

4.2. Controls

Two rotary switches for selecting operating mode and speed limit

A three-digit LED status display indicates operating mode, speed shown on the full-matrix display, error codes and more, depending on the operating mode and other factors

Green, orange, and red LED status indicators signify power is on, the solar charging system is active, activated alarms need checking, battery charge is low, and power failure

To conserve power, the status display and indicators power off automatically after a few seconds, reactivated with a momentary push-button switch or by using either rotary switch

See “Options and Optional Equipment” for touchscreen controller

4.2.1. Operating modes

A rotary switch allows selection of operating mode:

Off	Radar and matrix display are off All auxiliary devices are off Status display shows “OFF” or error codes (if any) Solar charging system is active
Run	Normal operating mode Radar and matrix display are on All auxiliary devices are on Status display shows selected speed limit or error codes Solar charging system is active
Run & beacons	Used with optional flashing beacons Radar and speed display are on Beacons flash with approach of oncoming vehicle All auxiliary devices are on Status display shows selected speed limit or error codes (if any) Solar charging system is active
Data Collector only	Used with optional Traffic Data Collector, when traffic data collection is desired without displaying speed Radar and matrix display are off Data Collector is on All other auxiliary devices are off Status display shows “CLA” Solar charging system is active

Data Collector & beacons	Used with optional flashing beacons and optional Traffic Data Collector, when traffic data collection is desired without displaying speed Radar and matrix display are off Beacons flash with approach of oncoming vehicle Data Collector is on All other auxiliary devices are off Status display shows “C.L.A.” Solar charging system is active
Schedule	Used with optional timer for automated on/off control Off and Run modes are controlled by timer Matrix display, radar, and all optional auxiliary devices are controlled by timer Status display shows “Sch” Solar charging system is active
Demo	Used for ensuring matrix display is performing correctly Matrix display consecutively shows 1-, 2-, and 3-digit speeds, SLOW DOWN message, and frowning face symbol If installed, flashers are active during excessive-speed message Radar is off Data Collector is on (if installed) All other auxiliary devices are off Status display shows “[d]” Solar charging system is active
Preview	Used for viewing available excessive-speed messages and other test patterns, one at a time, regardless of the configured message Matrix display shows one excessive-speed message, which can be changed by rotating the speed limit selector (when the speed limit selector is in the “0” position, the display is blank) Radar is active Data Collector is on (if installed) All other auxiliary devices are off Status display shows “[P]” Solar charging system is active
Radar setup	Continuous speed mode Used when replacing or testing radar, aligning trailer to traffic, or when traffic calming is not desired Matrix display shows actual speed regardless of speed limit Data Collector is on (if installed) All other auxiliary devices are off Status display shows actual speed Solar charging system is active

		Power test	Power, auxiliary devices, matrix LEDs, and battery load test mode Used for verifying all matrix-display pixels are functioning, for testing any auxiliary device after replacement, or to fully load the battery and verify it holds a charge Matrix display has all LEDs lit, at fixed brightness Radar is off Auxiliary devices are on Status display shows the system (AC or battery) voltage Solar charging system is active
		Status	System status mode Used for diagnostics and troubleshooting Speed Limit rotary switch selects sensor (voltage, current, temperature, etc.) Matrix display shows individual sensor readings with labels and extra decimals Radar is active Data Collector is on (if installed) All other auxiliary devices are off Status display shows sensor reading Solar charging system is active
		Service	Initialization mode Used when installing display modules and uploading software Matrix display shows alphabet characters Data Collector is on (if installed) All other auxiliary devices are off Status display shows “[S]” Solar charging system is active
4.2.2.	Speed settings	Choose speed limit with rotary switch: 10 to 75 mph in 5 mph increments 20 to 130 km/h in 10 km/h increments Units factory configured based on user-specifications, miles per hour (mph) or kilometers per hour (km/h); selectable with DIP switches on the systems PC board	
4.3.	Technology	State-of-the-art, solid-state electronics	
4.4.	PCB coating	5-mil, military-spec, silicone conformal coating provides long-term protection against moisture and other atmospheric contaminants	
4.5.	Temperature limits	–4 to 176°F (–20 to 80°C)	

5. RADAR

5.1.	Description	Radar senses the largest, nearest mass moving toward it
5.2.	Sensor	Microwave K-band, approach-only
5.3.	Location	Radar head located inside display cabinet, centered at top of electronic display, allowing sign to be installed on either side of road
5.4.	Distance range	1000 ft. (305 m)
5.5.	Speed range	5 to 138 mph (8 to 222 km/h)
5.6.	Accuracy	±1 mph from 5 to 100 mph (±1.6 km/h from 8 to 161 km/h)
5.7.	Temperature limits	–40 to 185 °F (–40 to 85 °C)
5.8.	Standards	CE compliant FCC approved
5.9.	Calibration	Calibration not required

6. POWER SYSTEM

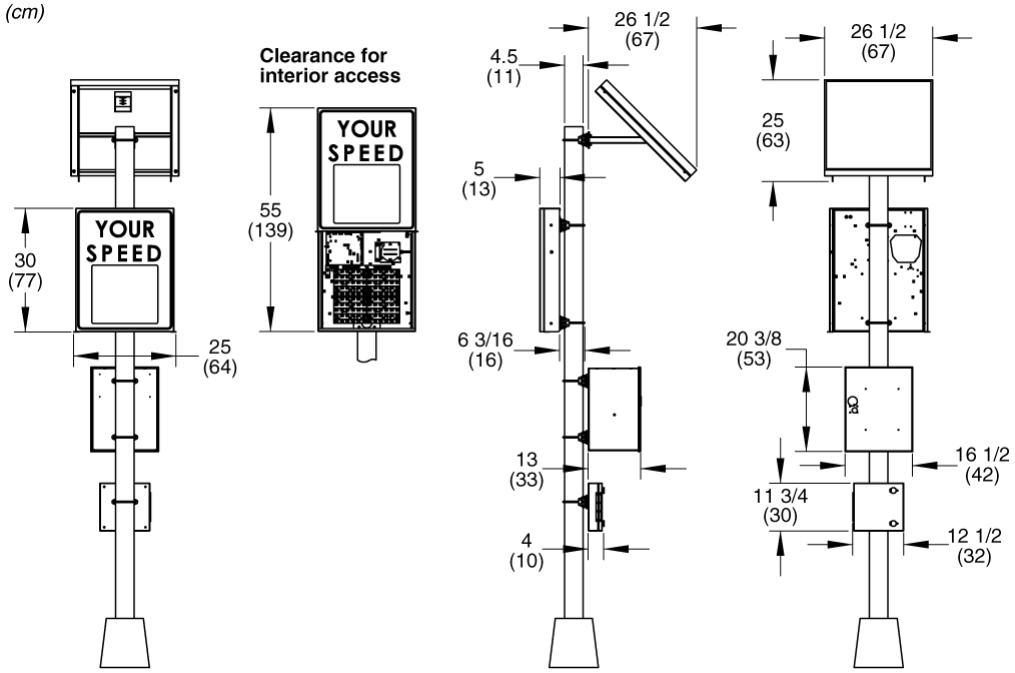
6.1.	Commercial power models	System hard-wired to commercial AC power	
6.1.1.	Input	85 to 270Vac, 5A	
6.1.2.	Output	12.8Vdc	
6.2.	Battery and solar models	Batteries provide system power; batteries charged automatically with integrated solar-based charging system	
6.2.1.	Battery box	Function	Holds batteries and optional controls
		Construction	Dust- and weather-resistant aluminum enclosure; not rated, comparable with NEMA 4 (IP65)
			Hinged door panel latches and locks with integral “police” lock
		Finish	Brushed aluminum
6.2.2.	Batteries	Description	Group 24 deep-cycle batteries
			See “Options and Optional Equipment” for battery options
		Quantity	Two
		Voltage	12Vdc each
		Current	750mA max.

		Capacity	150Ah total capacity @ 12Vdc
		Low-voltage disconnect (LVD)	To protect batteries from full discharge, the LVD system automatically shuts down power when battery voltage drops to preset level, and re-engages power when battery charge returns to optimum
6.2.3.	Solar	Panel	One high-efficiency multi-crystal photovoltaic solar module
		Power output	65W See “Options and Optional Equipment” for solar options
		Voltage	16.9Vdc max.
		Current	2.34A max. system current
		Voltage regulation	Charge from solar panel regulated by systems PC board
6.3.	System protection	Electrical components fused and reverse-polarity protected	
6.4.	System recovery	Recovers from power loss and returns to selected operation mode automatically when power is restored	

7. DIMENSIONS

7.1. Small display

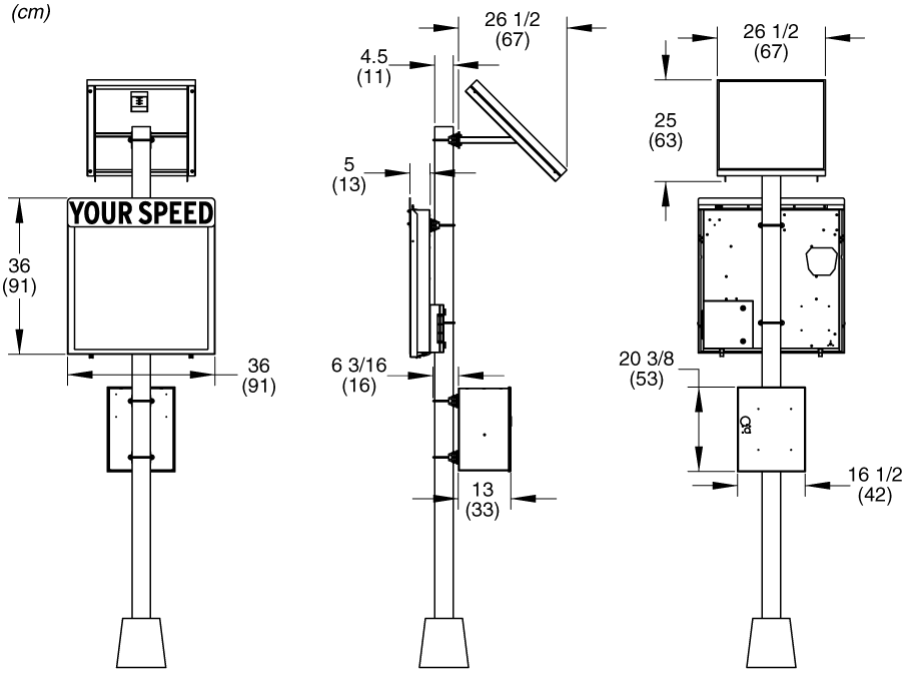
inches (cm)



Pole not included

7.2. Large display

inches (cm)



Pole not included

8. OPTIONS AND OPTIONAL EQUIPMENT

8.1.	**Controller**	Touchscreen controller replaces standard control system	
8.1.1.	Touchscreen	Display	Full color, backlit, 7-inch display Capacitive touch panel 800 x 480 pixels, W x H Display automatically shuts off after 20 minutes of inactivity
		Interface	Menu-based structure, accessed with virtual buttons on the touchscreen display, provides access to all sign functions including programming messages Virtual keyboard appears when required for text entry Multi-level password protection restricts access
8.1.2.	LED indicators	Indicates the following status conditions:	
		Solar charging system is charging batteries System power shutdown occurred Programmed schedule is active Power to optional radar device is on	
8.1.3.	Data port	1 USB port for local downloading of data from optional traffic data collector (if installed) and for system software updates See below for Traffic Data Classifier System	
8.2.	**Flashers**	Two flashing LEDs lights, located in display cabinet below electronic speed display, flash alternately when vehicles exceed “extreme speed”	
		Options	Red and blue flashing strobes White flashing strobes
8.3.	**Beacons**	Amber beacon lights flash when a vehicle approaches the sign	
		Option	One 8" LED signal light with Wanco flasher regulator
8.4.	**Mounting**		
8.4.1.	Aluminum pole	4" dia. (4.5" OD), 14 ft. tall with 15" square pedestal base, J-bolt kit	
8.4.2.	Brackets	Alternative and custom mounting brackets available; contact factory for details	
8.5.	**Regulatory sign**		
8.5.1.	Regulatory type	R2-1 Specify speed limit number	
8.5.2.	Material	Aluminum sheet	

8.5.3.	Reflectivity	Engineering grade Other grades also available; contact factory for details
8.5.4.	Size options	24" x 30"
8.5.5.	Mounting	Two pole clamps
8.6.	**Timer**	Provides on/off capability to control times of operation, including time of day, days of the week, and days of the year
8.7.	**Power**	
8.7.1.	Additional batteries	For geographic locations with less solar charging potential or colder weather, and for applications that require year-round charging, add batteries for greater capacity; contact factory for details
8.7.2.	Solar	For geographic locations with less solar charging potential or colder weather, and for applications that require year-round charging, additional solar power is available Options include 130W, 170W, and 260W solar arrays; contact factory for details
8.8.	**Remote communications**	
8.8.1.	Purpose	Enables access to speed sign control system from remote locations away from the sign, using an Internet-connected computer, tablet, or smartphone Requires upgrade to touchscreen controller
8.8.2.	Interface	Wanco Fleet Manager: Internet browser interface for managing remote controlled equipment; web-based application, no software installation Features include: Add or remove equipment to/from groups for quick access, ideal for managing contractor rentals or entire projects Map GPS locations of entire fleet of signs simultaneously Record vital information from signs, such as battery and solar voltages, and equipment alarms
8.8.3.	Modem	Compact industrial 4G LTE modem with GPS; contact factory for details
8.8.4.	Cellular plan	Options: Wanco Cellular Service: no activation charges, monthly payments, or overage charges; annual billing by Wanco Customer-provided service through Verizon®, AT&T®, or Sprint® Contact factory for details

8.9. Traffic Data Classifier System

8.9.1.	Design	Employs side-fire radar for logging and classifying traffic data. Nonintrusive, does not require loops or hoses, no disturbance of traffic flow during installation or use.
8.9.2.	Features	Data collector device Data analysis software application Local data download only Touchscreen controller replaces standard control system Increased solar capacity to 130 watts
8.9.3.	Direction	Registers both approaching and receding vehicles
8.9.4.	Traffic lanes	Most effective for 2-lane roads
8.9.5.	Traffic count	Can record data for more than 1 million vehicles in internal memory
8.9.6.	Data format	Speed, date, time, direction, length for each vehicle
8.9.7.	Units	English or metric
8.9.8.	Time stamp	Yr,Mo,Dy,Hr,Min,Sec.
8.9.9.	Speed range	5 to 138 mph (8 to 222 km/h)
8.9.10.	Sensor	Microwave K-band 24.125 GHz
8.9.11.	Power	Uses radar-speed sign power supply
8.9.12.	Power output	20 dbm (EIRP)
8.9.13.	Current	110 mA
8.9.14.	Internal memory	16GB
8.9.15.	Baud rate	9600, 8 bit, no parity
8.9.16.	Calibration	Calibration not required
8.9.17.	Regulatory rating	FCC part 15 class A, Canadian RSS-210
8.9.18.	Analytic software	Wanco Traffic Analyzer

EXHIBIT A: DISPLAY ACTIVATION SPEEDS

Miles per hour (mph)

User-Set Speed Limit	Vehicle Speed Triggered	Flashing Vehicle Speed Triggered	Excessive-Speed Message Triggered
10	5	11	13
15	8	16	20
20	10	21	25
25	15	26	30
30	20	31	37
35	29	36	45
40	34	41	50
45	39	46	55
50	44	51	60
55	49	56	65
65	59	66	75
75	69	76	85

Kilometers per hour (km/h)

User-Set Speed Limit	Vehicle Speed Triggered	Flashing Vehicle Speed Triggered	Excessive-Speed Message Triggered
20	10	21	24
30	16	31	38
40	24	41	48
50	34	51	61
60	50	61	76
70	60	71	86
80	69	81	96
90	79	91	106
100	90	101	116
110	100	111	126
120	109	121	136
130	119	131	146