POLE-MOUNT RADAR-SPEED SIGNS

MODEL WSDP
PRODUCT SPECIFICATIONS | MAY 2015
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 IP14

FCC Title 47, Part 15 (47 CFR 15)

2. **FEATURES**

2.1. **Operation**

- Electronic speed display with full matrix of LEDs
- Visors and shades over LEDs produce superior visibility
- Permanent pole-mount at any height
- Energy-efficient operation
- Display flashes when a vehicle exceeds speed limit
- Selectable speed limit setting
- Configurable, flashing excessive-speed message
- 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
2.2. Power system
- Hard-wired to commercial power or battery-powered with solar charging system
- Solar panel charges batteries automatically without intervention
- Charging system shuts down when batteries are fully charged, preventing damage
- Locking battery box prevents unauthorized access

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

2.4. 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
Signal input from integral radar head (see Radar)
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
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 open 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

Pre-wash: Cabinet and door are run through a five-stage, high-pressure, phosphate wash prior to finish coat
Coating: Cabinet and door are coated with oven-baked, white powder-coat finish to ensure durability and corrosion protection

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
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. Legibility  
> 1/4 mile (402m)

3.3.7. Visibility  
> 1/2 mile (805m)

3.3.8. Brightness  
Factory preset for optimal visibility and power consumption

3.3.9. 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.

3.3.10. 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 Weatherproof 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 weatherproof 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

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 with three dots (such as, “.5.0.”) or error codes
- 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.
- 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.
- 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
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
Data Collector is on
All other auxiliary devices are off
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
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
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
mph
±1 mph from 5 to 40 mph
±2 mph from >40 to 100 mph

km/h
±1.6 km/h from 8 to 64 km/h
±3.2 km/h from >64 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 Two deep-cycle gel-type batteries, wired in parallel and series for a 12-volt system
See “Options and Optional Equipment” for battery options
Voltage 6Vdc each
Input 12Vdc
Current 750mA max.
Capacity 70 Ah total capacity

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

7.2. Large display

Pole not included
8. OPTIONS AND OPTIONAL EQUIPMENT

8.1. Mounting

8.1.1. Aluminum pole 4" dia. (4.5" OD), 14 ft. tall with pedestal base

8.1.2. Brackets Alternative and custom mounting brackets available; contact factory for details

8.2. Regulatory sign

8.2.1. Regulatory type R2-1

8.2.2. Material Aluminum sheet

8.2.3. Reflectivity Engineering grade

Other grades also available; contact factory for details

8.2.4. Size options 24" x 30"

36" x 48"

8.2.5. Mounting User-supplied

8.3. Flashing lights

8.3.1. Flashers Two flashing LEDs lights, located in display cabinet below electronic speed display, flash alternately when vehicles exceed “extreme speed”

Options include red-and-blue “police” flashers or white flashers

8.3.2. Strobe Strobe light, located in display cabinet below electronic speed display, flashes when vehicles exceed “extreme speed,” simulating photo-radar camera strobe

8.3.3. Beacons One or more caution beacons flash when traffic approaches sign. Beacons use bright LEDs and are immediately visible when flashing. User-installed on pole.

8.4. Timer Provides on/off capability to control times of operation, including time of day, days of the week, and days of the year

8.5. Power

8.5.1. 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

8.5.2. 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; contact factory for details
### Traffic Data Classifier System

8.6.1. **Design**  
Radar-based, nonintrusive, does not require loops or hoses, no disturbance of traffic flow during installation or use

8.6.2. **Direction**  
Registers both approaching and receding vehicles

8.6.3. **Traffic lanes**  
Most effective for 2-lane roads

8.6.4. **Traffic count**  
Can record data for more than 1 million vehicles in internal memory

8.6.5. **Data format**  
Speed, date, time, direction, length for each vehicle

8.6.6. **Units**  
English or metric

8.6.7. **Time stamp**  
Yr, Mo, Dy, Hr, Min, Sec.

8.6.8. **Speed range**  
5 to 138 mph (8 to 222 km/h)

8.6.9. **Sensor**  
Microwave K-band 24.125 GHz

8.6.10. **Power**  
Uses radar-speed sign power supply

8.6.11. **Power output**  
20 dbm (EIRP)

8.6.12. **Current**  
110 mA

8.6.13. **Temperature**  
Operating limits: –40 to 185 °F (–40 to 85 °C)

8.6.14. **Internal memory**  
1MB (1,048,576 bytes)

8.6.15. **Baud rate**  
9600, 8 bit, no parity

8.6.16. **Installation**  
Mounted below electronic speed display in adjustable bracket
**EXHIBIT A: DISPLAY ACTIVATION SPEEDS**

Miles per hour (mph)

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<th>User-Set Speed Limit</th>
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<th>Flashing Vehicle Speed Triggered</th>
<th>Excessive-Speed Message Triggered</th>
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Kilometers per hour (km/h)

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