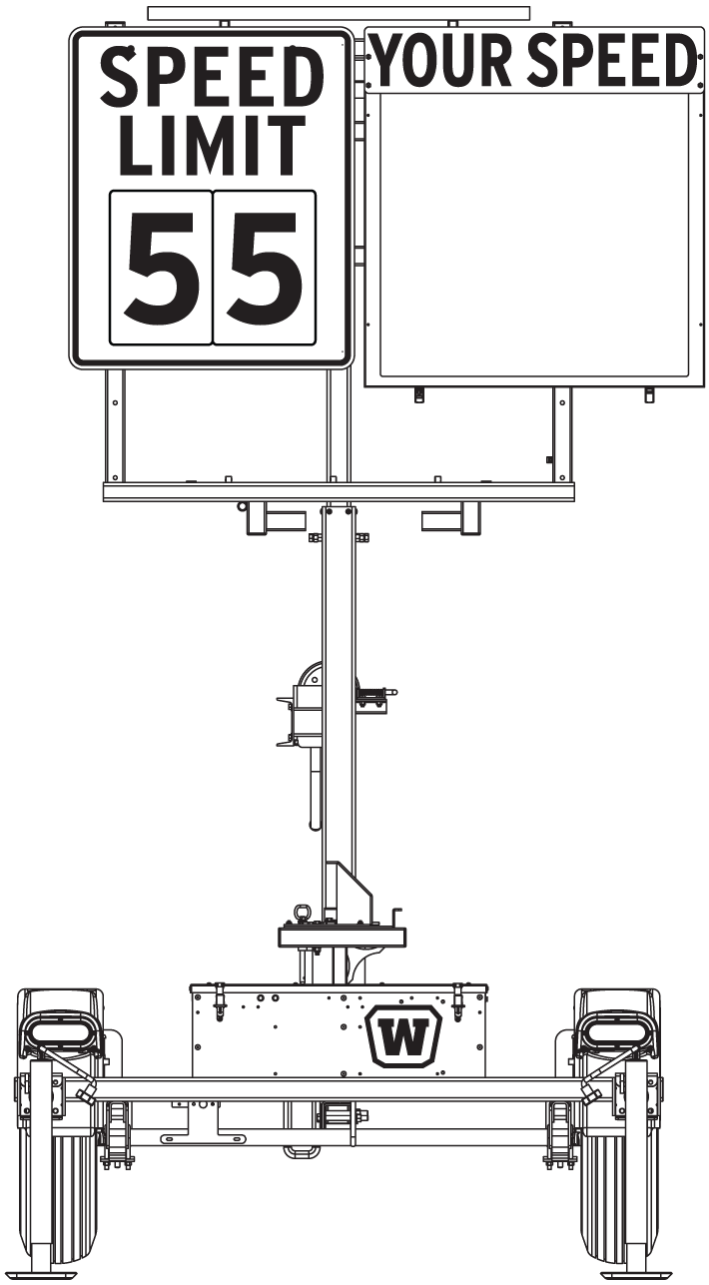
VERTICAL-MAST RADAR-SPEED TRAILER

MODEL WSDTV
PRODUCT SPECIFICATIONS | FEBRUARY 2022



1. SYSTEM

1.1. Description

Wanco speed trailers provide vehicle speed detection and display, in a portable platform that does not require permanent installation or wiring.

Using built-in radar, the speed trailer detects the speed of oncoming vehicles, then displays that 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. Model

WSDTV Wanco radar-speed trailer with full-matrix electronic display and regulatory speed-limit sign on vertical mast

1.3. Temperature limits

Operating temperature, –40 to 176°F (–40 to 80°C)

1.4. Standards

Compliant in accordance with:

MUTCD, December 2009	§2A.18, Mounting Height
ITE Standard, June 2007	§5.82, Nighttime Dimming; §6.4.3, Environmental Tests; §6.4.6.3, Electronic Noise
International Protection Rating	IP54
FCC	Title 47, Part 15 (47 CFR 15)

2. FEATURES

2.1. Setup

- Portable system is easy to transport and deploy
- Large regulatory speed-limit sign has changeable speed numbers
- Selectable speed limit setting
- Configurable, flashing excessive-speed message
- Heavy-duty hand-winch with safety brake raises signs frame for deployment
- Single locking device holds frame in place while operating and during transport

2.2. Operation

- Extra-large electronic speed display with full matrix of LEDs
- Lenses and shades over LEDs produce superior visibility
- Display visible over standard Jersey barrier traffic divider
- Display rotates to face traffic without moving trailer
- 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
- Weather-resistant control box cover has lockable latches
- See-through design puts road workers in view

2.3. Power system

- Battery powered and solar charging
- Energy-efficient operation results in long run times
- Solar panel charges batteries automatically without intervention
- Charging system shuts down when batteries are fully charged, preventing damage
- Unique system allows battery charging with solar panel or commercial power
- Cooling fan protects battery charger from overheating
- Battery box can be locked to prevent unauthorized access

2.4. Maintenance

- Individual display modules can be replaced easily
- Standard trailer tires
- Heavy-duty bolt-on fenders can be replaced if damaged
- Durable powder-coat finish resists the elements

2.5. Application

Common applications include:

- Highways and other high-speed arterials
- Work zones

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

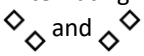
3.1.1. Speed display

Signal input from integral radar head (see Radar)
One or two digits, 5 to 99 mph; two or three digits, 10 to 170 km/h
Units are selectable
One bold font, 26" (66cm) high, characters vary in width

3.1.2. Excessive-speed messages

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 in triangle)
◇	Diamond symbol

	Bar symbol
	Four corners symbol
Alternating  and	Wig-wag (alternating double diamonds) symbols

3.2.	Cabinet		
3.2.1.	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	
3.2.2.	Size	36" x 36" x 5" (91 x 91 x 12 cm), W x H x D	
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 4 (IP54)	
3.2.5.	Door	Rigid door frame, hinged at top and latched at bottom, stays opens for easy maintenance; latches accept user-supplied padlocks	
3.2.6.	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.	
3.2.7.	Window	Clear polycarbonate resin thermoplastic window installed in door frame, UV-resistant, anti-glare surface, 0.150" thick	
3.2.8.	Location	Mounted to welded steel frame on tower, to right of speed limit sign	
3.3.	“YOUR SPEED” sign	Type 3 high-intensity reflective sheeting, attached to front door panel with five bolts	
3.4.	Display matrix		
3.4.1.	Display modules	Modular design	Allows any display module to 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
3.4.2.	Pixels	Description	Two LEDs form a “pixel”
		Display module	12 pixels wide by 10 high, 120 pixels total
		Full matrix	24 pixels wide by 20 high, 480 pixels total
		Pixel size	0.75" x 0.75" (19 x 19mm)
		Pixel pitch	34mm, horizontal and vertical
3.4.3.	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)
3.4.4.	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.	
3.4.5.	Viewing angle	Total viewing area with optical lenses, 50 degrees	
3.4.6.	Legibility	> 1/4 mile (402m)	
3.4.7.	Visibility	> 1/2 mile (805m)	

3.4.8.	Brightness	Factory preset for optimal visibility and power consumption	
3.4.9.	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	
3.4.10.	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 SYSTEM

4.1.	Control box		
4.1.1.	Location	Back of electronic speed display	
4.1.2.	Size	12.3" x 11.7" x 5.3" (31.2 x 29.7 x 14.4 cm) W x H x D	
4.1.3.	Material	0.08" aluminum	
4.1.4.	Door	Front-panel is a door, hinged on the left, which opens fully	
4.1.5.	Latches	Two quarter-turn latches on front of control box door keep hinged door closed. Both latches are keyed and can be locked.	
4.1.6.	Finish	Control box and door are coated with oven-baked, equipment-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.	
4.1.7.	Rating	Weather-resistant, comparable to IP55	
4.2.	Control panel		
4.2.1.	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	

4.2.2. 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 speed display are on All auxiliary devices are on Status display shows selected speed limit or error codes (if any) 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 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
4.2.3.	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. REGULATORY SIGN

6.1.	Description	R2-1 regulatory speed limit sign has threaded mounting studs for attaching interchangeable speed limit numbers, which are supplied by the factory and stored in the trailer's battery box
6.2.	Material	Aluminum sheet, 0.080" (2mm) thick, with high-intensity reflective coating
6.3.	Location	Mounted to welded steel frame on tower, to left of electronic speed display Face of sign is flush with face of speed display
6.4.	Size	30" x 36" (76 x 91cm), W x H See "Options and Optional Equipment" for sign options

7. TRAILER

7.1.	Frame	
7.1.1.	Construction	All welded structural steel
7.1.2.	Tie-downs	Two tie-down loops at the front corners of the trailer frame One tie-down loop centered at rear of trailer frame
7.1.3.	Finish	Oven-baked, safety-orange powder-coat finish to ensure durability and corrosion protection. Assemblies are bead-blasted and then run through a five-stage, high-pressure phosphate-wash prior to application of the finish coat. See "Options and Optional Equipment" for color options.
7.2.	Fenders	Round, full wheel coverage, bolted to trailer frame, removable and replaceable
7.3.	Axle assembly	2000 lb. (907kg) capacity, 5 on 4.5" B.C. idler hub
7.4.	Springs	Double-eye leaf springs
7.5.	Tires	ST205/75D15 steel-belted trailer tires, load rating B
7.6.	Drawbar	
7.6.1.	Construction	Telescopes inside receiver sleeve welded under trailer frame. Removable for shipping and for added theft protection if needed. Secures with two 1/2-inch diameter bolts.
7.6.2.	Material	3" (7.62cm) square steel tubing, 3/16" (0.476cm) wall

7.6.3.	Jack	Top-wind swivel, 2000-lb. (907kg) capacity, steel footpad, 10" (25cm) total travel
7.6.4.	Tow hitch	Standard 2-inch ball coupler tow-hitch, SAE Class 2, 3500-lb. (1588kg) capacity, bolted to drawbar, removable and replaceable See “Options and Optional Equipment” for tow-hitch options
7.6.5.	Tow chains	Two high-test proof coil chain assemblies with clevis slip hooks for towing. Chains attached to drawbar with quick connectors. Material diameter 0.406" (10.3mm) Working load limit 5400 lbs. (2450kg) Breaking force 16,200 lbs. (72kN)
7.7.	Stabilizer jacks	Four swivel jacks, each with 2000-lb. (907kg) capacity, one on each corner of trailer frame
7.8.	Wind resistance	Approx. 57mph (91km/h), calculated maximum sustained wind load before overturning, trailer in deployed position supported by five stabilizer jacks with tires off the ground
7.9.	Wiring	
7.9.1.	Description	Wiring to connect tow vehicle and trailer for trailer taillights is installed inside drawbar, with pigtails and connectors at both ends; no crimping required
7.9.2.	Trailer plug	A sealed, molded, 4-square connector plugs into harness under trailer
7.9.3.	Tow-vehicle plug	Two-piece assembly with 4-flat molded connector on harness plugs into tow vehicle Meets SAE J1239 See “Options and Optional Equipment” for tow-vehicle plug options
7.9.4.	Protection	All trailer wiring encased in UV protective loom, and attached with P-clamps riveted to trailer frame; no exposed wires
7.10.	Taillights	Two oval-shaped, sealed, LED, combination stop, turn and taillights integrated with fenders
7.11.	License plate	Lighted license plate holder is mounted under rear of trailer frame
7.12.	Reflectors	Two amber reflectors, one on the side of each upright Two red reflectors on rear trailer frame See “Options and Optional Equipment” for reflective tape

7.13.	Tower assembly		
7.13.1.	Function	Speed display and regulatory sign are raised and lowered on a telescoping tower	
7.13.2.	Tower construction	Two sections of square steel tubing with the inner section telescoping inside the outer section. Nylon guide blocks keep the sections tight, eliminating the need for greasing the tower and preventing dirt from building up on the inner tower section. Dirt would cause performance problems and maintenance issues.	
7.13.3.	Swivel base	A steel tubular weldment (the “swivel base”) is bolted to the trailer frame. The outer tower section rotates on a thrust bearing and washers inside the swivel base, reducing rotating friction.	
7.13.4.	Finish	Lower tower section and swivel base are coated with oven-baked, safety-orange 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. Upper tower section is zinc-plated for corrosion resistance. See “Options and Optional Equipment” for color options.	
7.13.5.	Height lock	Spring-loaded locking pin prevents tower from falling if the winch or cable were to fail. Also locks tower when fully lowered into travel position.	
7.13.6.	Winch assembly	Function	Hand-operated winch raises and lowers tower
		Capacity	1500 lbs. (680kg)
		Brake	Safety friction-brake prevents tower from falling if operator loses grip on winch handle
		Cable	1/4" (6.35mm) diameter galvanized aircraft cable
7.13.7.	Rotation	Tower rotates by hand, pivoting 360 degrees	
7.13.8.	Rotation lock	Locking pin inserted into horizontal plate mounted to tower prevents tower from rotating	
7.13.9.	Sight tube	A sight tube for aiming the speed display in desired direction is mounted to the underside of the speed display frame	
7.13.10.	Storage	When lowered for storage and transport, the signs frame (with electronic display and speed limit sign attached) rests in a support cradle, parallel to the trailer length	

8. POWER SYSTEM

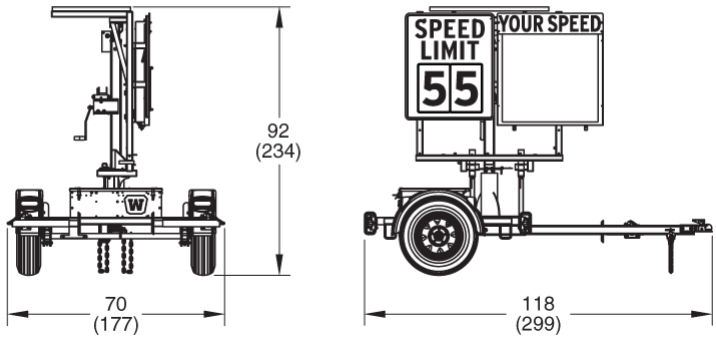
8.1.	Description	Batteries provide system power; batteries charged automatically with integrated solar-based charging system
8.2.	Battery box	
8.2.1.	Function	Holds batteries, remote charger, and spare numbers for speed limit sign
		See “Options and Optional Equipment” for heavy-duty secure battery box
8.2.2.	Construction	Riveted all-steel construction, weather-resistant
		All parts phosphate-washed and powder-coated before assembly
		Divider panel inside box separates batteries from electronics
		Louvers provide ventilation
		Latches keep cover closed and can accept user-supplied padlocks
8.2.3.	Location	Unobstructed location, centered over axle between fenders, bolted to trailer frame
8.3.	Batteries	
8.3.1.	Description	Group 24 deep-cycle batteries, wired in parallel and series for a 12-volt system
		See “Options and Optional Equipment” for battery options
8.3.2.	Quantity	Four
8.3.3.	Voltage	6Vdc each
8.3.4.	Weight	Approx. 60 lbs. (26kg) each
8.3.5.	Capacity	430 Ah total capacity @ 12Vdc
8.3.6.	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
8.4.	Remote charger	
8.4.1.	Function	Plugs into a standard commercial power source to recharge batteries if battery voltage drops due to lack of sun for automated solar charging system
8.4.2.	Type	12-volt battery charger
8.4.3.	Location	Inside battery box, mounted to divider panel on opposite side from batteries
8.4.4.	Output capacity	15A
		See “Options and Optional Equipment” for charger output options

8.4.5.	Output voltage	13.2Vdc range “float” mode 13.6Vdc range “absorption” mode 14.2Vdc range “bulk” mode
8.4.6.	Input voltage	105 to 135Vac, standard three-prong plug
8.4.7.	Input frequency	50 to 60 Hz
8.4.8.	Cooling	Fan cooled when charger temperature reaches 95°F (35°C)
8.4.9.	Protection	Automotive-style replaceable fuses
8.5.	Solar	
8.5.1.	Panel	One high-efficiency multi-crystal photovoltaic solar module
8.5.2.	Location	Behind signs, over tower. No shadowing effect on any traffic-facing component. Solar panel lies flat for continuous charging regardless of folding frame position; rises and rotates with signs.
8.5.3.	Power output	85W See “Options and Optional Equipment” for solar power options
8.5.4.	Current	9.5A max. system current 10.3A open short-circuit current
8.5.5.	Voltage	17.9Vdc max. 21.8Vdc open short-circuit voltage
8.5.6.	Voltage regulation	Charge from solar panel regulated by systems PC board
8.5.7.	Security	Solar panel bolted to mounting frame with security screws and special security nut
8.6.	System protection	Electrical components fused and reverse-polarity protected
8.7.	System recovery	Recovers from power loss and returns to selected operation mode automatically when power is restored

9. DIMENSIONS & WEIGHT

9.1. Dimensions *inches (cm)*

Travel position



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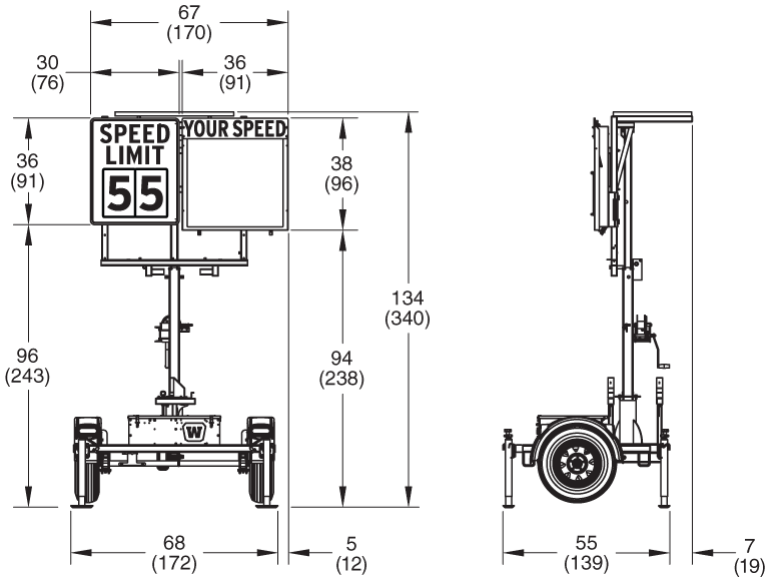

9.2. Weight Approx. 1250 lb (567kg)

10. OPTIONS AND OPTIONAL EQUIPMENT

10.1. Controller — Touchscreen controller replaces standard control system

10.1.1. 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

10.1.2. 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

10.1.3. 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

10.2. 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

10.3. Beacons — Amber beacon lights flash when a vehicle approaches the sign

Options:
- Two PAR 46 12Vdc LED beacons with 12" (305mm) back panels; includes increased solar capacity to 130 watts
- Two 8" LED signal lights, top- and bottom-mounted, one above and one below signs; includes increased solar capacity to 170 watts
- Two 12" LED signal lights, top- and bottom-mounted, one above and one below signs; includes increased solar capacity to 170 watts
- One PAR 46 12Vdc LED rear-facing beacon

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

10.5.	**Tow hitch**		
10.5.1.	Combo hitch	Combo-hitch for 2-inch ball and standard lunette ring for pintle hook, 2½" ID x 1" cross-section	
10.5.2.	Lunette ring	Options	Standard ring for pintle hook, 2½" ID x 1" cross-section Heavy-duty ring for pintle hook, 3" ID x 1⅝" cross-section
10.6.	**Tow-vehicle plug**	Many types of plugs available, prewired at the factory; contact factory for details	
10.7.	**Ballasted trailer deck**	Structural deck adds 370 lb (168kg) to base of trailer to overall weight, creating a low center of gravity and improving stability	
10.8.	**Power system**		
10.8.1.	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	
		Option	Add two Group 24 deep-cycle batteries, 215Ah additional capacity
10.8.2.	AGM batteries	Replace deep-cycle batteries with top-of-the-line absorbed glass mat (AGM) batteries	
		Features	100% maintenance-free Sealed and spill-proof Faster recharge and greater freeze resistance than conventional batteries Contains less lead than conventional batteries
		Options	Two 4D AGM 12Vdc batteries, 400Ah total capacity Three 4D AGM 12Vdc batteries, 600Ah total capacity
		Weight	Approx. 160 lbs. (72kg) each
10.8.3.	Charger	When required for faster battery charging, replace standard remote charger with higher amperage, 45-amp, 12-volt charger	
10.8.4.	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	
10.8.5.	Secure battery box	High-security battery box features heavy-gauge steel lid, hidden hinges, and heavy-duty hidden-shackle padlocks; replaces standard battery box	
10.9.	**Axle-lock bar**	Anti-theft axle-lock bar prevents wheels from turning. Requires user-supplied padlock.	
10.10.	**Reflective tape**	Reflective red-and-white conspicuity tape across rear trailer frame for increased visibility	
10.11.	**Finish color**	Specify power-coat color and, if applicable, color scheme	

10.12. Remote communications

10.12.1.	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
10.12.2.	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
			Access and download data from Traffic Data Classifier System (if installed)
10.12.3.	Modem		Compact industrial 4G LTE modem with GPS; contact factory for details
10.12.4.	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

10.13. Traffic Data Classifier System

10.13.1.	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.
10.13.2.	Options	Standard	Includes data collector device installed on speed trailer, data analysis software application, and the following:
			Touchscreen controller
			Increased solar capacity to 130 watts
			Increased battery capacity with two 4D AGM 12Vdc batteries
			Large battery box
			45-amp battery charger
			Local data download only
		Premium	Includes all features of the standard option and adds the following:
			Increased solar capacity to 170 watts
			Heavy-duty secure battery box
			High-speed 4G LTE cellular modem with built-in GPS (requires cellular plan)
			Local and remote data download

10.13.3.	Direction	Registers both approaching and departing vehicles
10.13.4.	Traffic lanes	Most effective for 2-lane roads
10.13.5.	Traffic count	Can record data for up to 5 million vehicles in internal memory
10.13.6.	Data format	Speed, date, time, direction, length for each vehicle
10.13.7.	Units	Imperial or metric
10.13.8.	Time stamp	Yr,Mo,Dy,Hr,Min,Sec
10.13.9.	Speed range	5 to 138 mph (8 to 222 km/h)
10.13.10.	Sensor	Microwave K-band 24.125 GHz
10.13.11.	Power supply	Speed-limit trailer batteries
10.13.12.	Power output	20 dbm (EIRP)
10.13.13.	Current	110 mA
10.13.14.	Internal memory	16GB
10.13.15.	Baud rate	9600, 8 bit, no parity
10.13.16.	Calibration	Calibration not required
10.13.17.	Regulatory rating	FCC part 15 class A, Canadian RSS-210
10.13.18.	Installation	Automatically positioned when trailer is level; adjustable bracket allows user to point toward traffic at a 45-degree angle
10.13.19.	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