5-COLOR METRO™ MESSAGE SIGN

MODEL WVTMM-L-5C
PRODUCT SPECIFICATIONS | JANUARY 2014
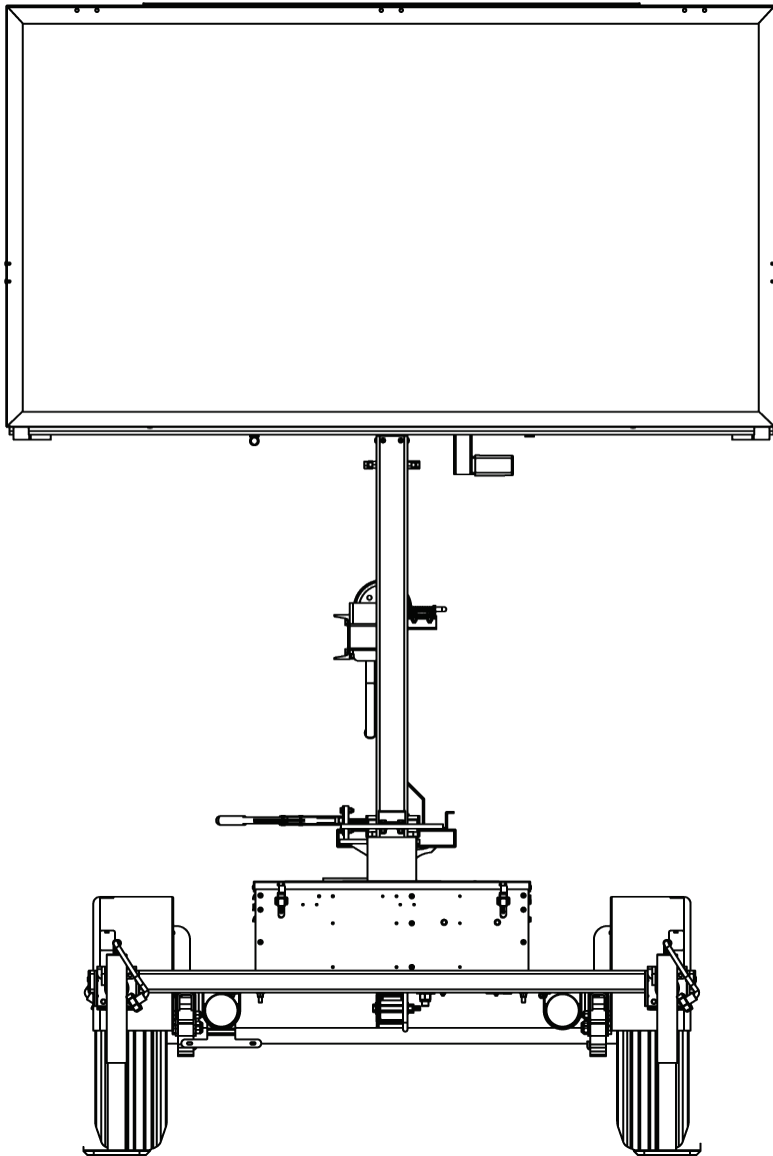
1.   DESCRIPTION

1.1.	Description	Wanco® designed the Metro™ message sign for use in metropolitan areas and wherever trailer size is a concern. The Metro sign provides the visibility and legibility of other Wanco message signs, but with a smaller footprint.

The color Metro message sign provides information to the public on a five-color LED display that can present text, graphics, or a combination of both. The color display uses state-of-the-art technology to achieve excellent visibility with the least power consumption of any available portable color message sign. This sign is portable and self-powered, requiring no permanent installation or wiring. Its compact design makes it highly maneuverable and easy to deploy. The trailer can be towed by most vehicles.

The Metro sign has a self-contained onboard computer and a touchscreen controller, making a laptop or external controller unnecessary. A laptop can be connected if desired. The sign comes configured with preprogrammed standard messages, and users can create custom messages easily.

For optimal positioning, the message sign display panel rotates independent of the trailer and its height is fully adjustable. Jack-legs provide stability.

Power is provided by maintenance-free batteries, which are charged by an automated solar charging system.

1.2.	Model	WVTMM-L-5C Metro matrix message sign with five-color display

2.   FEATURES

2.1.	Message design	• Message Graphics computer software included for creating custom messages
		• Create, import and edit graphics
		• Add and format text
		• Export messages to sign and save files for copying and editing
2.2.	Setup	• Heavy-duty hand-winch allows one person to easily raise and lower the sign display
		• Tower rotates 360 degrees for optimal positioning
		• Single disk brake holds tower in place during operation, while a cradle supports and holds board in travel position
2.3.	Operation	• Five-color, full-matrix display for text and graphics
		• Self-contained onboard computer
		• Full-color touchscreen controller with high-resolution display
		• User-supplied laptop with Wanco software is optional
		• Multi-level password protection restricts access to control software
		• Preprogrammed text messages, symbols and graphics
		• Internal clock facilitates built-in schedule programming
		• Multiple alphanumeric fonts

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2.4.	Power system	• Energy-efficient operation results in long run times
		• Solar panels charge batteries automatically without intervention
		• System shuts down solar-panel charging system when batteries are fully charged, preventing damage
		• Power system allows battery charging with solar panels or commercial power
		• Cooling fan protects battery charger from overheating
		• Battery box can be locked to prevent unauthorized access
2.5.	Maintenance	• Maintenance-free batteries
		• Individual display modules can be replaced easily
		• Standard trailer tires
		• Heavy-duty bolt-on steel fenders can be replaced if damaged
2.6.	Application	Common uses for the Metro sign include urban areas where a sidewalk is the only place to put a message sign, congested streets where a larger sign might impede traffic, and anywhere a larger sign is not practical. Common applications for color signs include:
		• Special events
		• Traffic calming
		• Emergency response
		• Public notices
		• Corporate functions

3.   DISPLAY

3.1.   Cabinet

3.1.1.	Description	Weather-resistant cabinet contains display modules and related electronics. Hinged door with full-size display window protects electronics and provides access for maintenance. Clasps hold door closed during operation and the door can be locked with user-supplied padlock.
3.1.2.	Size	89" x 49" x 6" (226 x 124 x 15cm) W x H x D
3.1.3.	Material	Aluminum sheet, 5052-H32, 0.062" (1.575mm) thick
3.1.4.	Construction	Panels are riveted together, with internal ribs to add lateral strength
3.1.5.	Door	Cabinet door is aluminum extruded frame with sheet metal corner brackets. Stainless steel butt hinges are bolted to top of cabinet and door.
		Window is anti-glare Lexan® solar-grade polycarbonate, 0.150" (3.81mm) thick. Bulb-type weather seal ensures tight fit and seal between window and door frame.
		When sign is in stored position, door fully opens to service the sign cabinet interior. Telescoping prop-slides, one on each side of the cabinet, hold door open.

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|			
3.1.6.	Finish		Cabinet and door are coated with oven-baked, powder-coat finish to ensure durability and corrosion protection. Cabinet is coated white on the outside, flat black on the inside; door is flat black. Assemblies are high-pressure phosphate-washed prior to finish coat.
3.1.7.	Wiring		Wiring service loop from computer box to display cabinet is routed inside liquid-tight loom and P-clamped to trailer frame. Service loop length is designed to allow sign rotation. All wiring connectors and procedures are per CSA standards.
3.1.8.	Storage		When lowered for storage and transport, the display cabinet rests in a support cradle, parallel to the trailer length, no locking pins required
3.2.	Display matrix		
3.2.1.	Description		The display matrix is comprised of a series of display modules laid out in a grid across the inside of the display cabinet. Each module has a matrix of LEDs installed on its face, which light up to show a portion of the configured message. Each module features the necessary electronics and coatings to ensure outstanding performance and durability.
3.2.2.	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. All wiring terminates at a single terminal strip inside the display cabinet.
		Replacement	Each module can be exchanged in less than two minutes. The only tool needed is 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. Initialization is accomplished using the sign's controller.
		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

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	Temperature limits	–40 to 176°F (–40 to 80°C)
	Humidity limits	Conformal coating rated to 95% relative humidity

3.2.3. Pixels   A cluster of 15 LEDs form a "pixel"

Each pixel has 3 LEDs of each color (amber, blue, green, red, white):
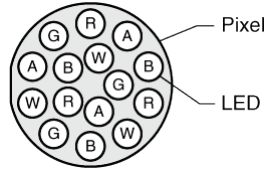
	Pixel size	1.0625" (27mm) diameter
	Full matrix	50 pixels wide by 24 pixels high, 1200 pixels total
	Display module	10 pixels wide by 8 high, 80 pixels total
	Pixel pitch	42mm, horizontal and vertical

3.2.4. 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

		Amber	589.5 to 592.0 nm
		Blue	470 to 475 nm
		Green	525 to 530 nm
		Red	620 to 625 nm
		White	Not applicable

	Current	10 mA peak-pulsed forward current
	Temperature limits	Operating temperature, –40 to 212°F (–40 to 100°C)

3.2.5. LED shields   Each individual LED is shielded from the other LEDs in each pixel, preventing "phantom" lighting of unlit LEDs by lit LEDs, reducing reflected light, improving angularity, and enhancing the clarity of the display

3.2.6. Viewing angle   Total viewing area, 25 degrees nominal

3.2.7. Brightness   Factory preset for optimal viewing and power consumption

3.2.8. Auto dimming   Two photocells detect ambient light on the message sign; the message sign computer adjusts the brightness of the LEDs accordingly, dimming display brightness in darkness, increasing to full brightness in daylight

Photocells are mounted inside the sign cabinet, one facing rear and one facing front

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3.2.9.	Software design	Driver	LEDs controlled through 10mA 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, preventing the message from shifting due to an individual module failure.
		Pixel test	Each module is equipped with individual pixel failure notification
3.2.10.	Fonts		12 fonts (for samples, see Exhibit A)
		Default size	5 x 7 pixels (W x H), 7.68" x 10.98" (19.5 x 27.9cm)
			Character spacing for standard three line message, 3" (7.6cm) between lines, 3" (7.6cm) between letters
			Maximum 3 lines of 8 letters per line
		Smallest size	4 x 5 pixels (W x H)
		Largest size	11 x 23 pixels (W x H)
		Other sizes	See Exhibit A

4. CONTROL SYSTEM

4.1.	Computer		
4.1.1.	Description		Self-contained onboard computer, located inside battery box, comprises main motherboard and power control board, controls sign functions
4.1.2.	Housing	Material	18ga steel
		Size	11.5" x 9.50" x 3.75" (29.1 x 24.1 x 9.5cm) W x H x D
		Finish	Oven-baked, flat-black, powder-coat finish to ensure durability and corrosion protection; high-pressure phosphate-washed prior to finish coat. All parts powder-coated before assembly.
		Mounting	Welded mounting flanges; bolted to bottom of battery box
		Internal access	Top panel is bolted in place and can be removed for access to internal components
4.1.3.	Temperature limits		–40 to 176°F (–40 to 80°C)
4.1.4.	Wiring		One CPC connector for wiring cable from message sign
			One CPC connector for wiring cable from power supply

4.1.5.	Ports	One USB power/communication port for connection to controller
		One Ethernet communications port for optional connection to laptop computer or modem
		Two DB9 serial ports for connection to auxiliary devices

| 4.2. | Controller | |

| 4.2.1. | Description | Touchscreen interface, connected to computer for programming and running sign display. |
| | | No laptop computer required, but a laptop with Wanco software can be connected in place of controller if desired. |

4.2.2.	Touchscreen	Display	Full color, backlit, 7-inch display
			800 x 480 pixels
			Display automatically shuts off after 10 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
			Day/night virtual button, changes contrast for use in bright or dim lighting conditions
			Message on sign is always shown while interface is active

4.2.3.	Housing	Backplate	Internal components mounted to aluminum backplate for rigidity
		Cover	Injection-molded PC/ABS
		Size	8.0" x 5.5" x 1.6" (20.3 x 14.0 x 4.1cm) W x H x D

| 4.2.4. | Storage and removal | Stored in cradle inside battery box. Can be lifted out of cradle and is designed to be handheld. Can be disconnected and removed. |

| 4.2.5. | Wiring | Connected to computer with USB cable |

4.2.6.	Power	Power supplied from computer
		Push-button on bottom of housing provides manual on/off control and interface activation after timeout
		Electronics automatically shut down after 20 minutes of inactivity

| 4.2.7. | Weight | 1.6 lbs. (0.73kg) |

| 4.2.8. | Temperature limits | −4 to 158°F (−20 to 70°C) |

4.3.   PC boards

4.3.1.   Data ports   5 serial ports; 2 USB ports, 1 Ethernet port

4.3.2.   Coating   100% coated with military-spec, low-VOC, silicone conformal coating to provide long-term protection against moisture and other atmospheric contaminants. Resists corrosion and shorts due to high humidity.

4.3.3.   Temperature limits   –4 to 176°F (–20 to 80°C)

4.3.4.   Humidity limits   Conformal coating rated to 95% relative humidity

4.4.   Controller software

4.4.1.   Standards   Fully NTCIP-compliant

4.4.2.   Security   Three levels of password protection

4.4.3.   Message   Instant access to program new messages
          programming
                                Extremely easy to program

4.4.4.   Message types   Quick-messages   Easy quick-message activation

                                Permanent   Over 90 preprogrammed permanent messages, including arrows and FHWA standards

                                Changeable   250 changeable messages stored in NV flash

                                Temporary   10 temporary or volatile messages, for ITS systems

                                Blank   Easy sign blanking/power off

4.4.5.   Interface display   WYSIWYG (What You See Is What You Get) while programming

4.4.6.   Text alignment   Selectable: left, center, or right; and top, middle, or bottom

4.4.7.   Fonts   Selectable: see Exhibit A

4.4.8.   Blinking   Each character can individually blink

                                Individual lines of a multi-line message can blink

                                The entire message can blink

                                Adjustable timing and duty cycle

4.4.9.   Message pages   Maximum 10 sequential "pages" per message, sequencing speed from 0.1 to 25.5 sec.

4.4.10.   Scheduling   Real-time clock and calendar with DST control

4.4.11.	Arrow board functions	Sign can display any of the following 12 full-size arrow functions	
		Modes	Flashing left or right arrow
			Flashing double arrow
			Flashing four-corner warning
			Flashing caution-bar warning
			Sequencing left or right arrow
			Sequencing left or right stem arrow
			Sequencing left or right chevron arrows
			Alternating diamonds
			(for samples, see Exhibit B)
		Bold graphics	Each arrow and bar is 5 pixels wide
4.4.12.	Configuration	Menus provide access to all message sign configuration settings	
4.4.13.	Troubleshooting	Status and diagnostic menus provide message sign information to assist in troubleshooting	

5.   GRAPHICS SOFTWARE

5.1.	Description	Computer software provides the tools necessary for creating custom messages. Create new messages in five colors. Create messages from scratch using text, graphics or a combination of both; or edit previously created messages. Import graphic images, such as logos and digital photos.
5.2.	System requirements	Any computer running Microsoft® Windows® XP, Vista, 7, or 8
5.3.	File formats	Save files in proprietary format that the program can open for editing
		Save objects created in a message for re-use when creating new messages
		Export files in the NTCIP MULTI format for uploading to a message sign
		Import MULTI files for bitmap editing
5.4.	Message transfer	Transfer messages to sign directly from the graphics program when the computer is connected to the sign via a wireless modem or a wired Ethernet connection
		Transfer messages to the sign using the Wanco NTCIP Central software after export in the MULTI file format
		Transfer messages to the sign using a USB flash drive after export in the MULTI file format

6.   TRAILER

6.1.	Frame	All welded structural steel
6.2.	Fenders	Round full wheel coverage fenders with inner splash panel on each fender. Fenders are bolted to the trailer frame. Material: 16ga steel
6.3.	Tie-downs	Three tie-downs: one on each front corner of frame, one centered on rear of frame
6.4.	Finish	Frame is 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 finish coat. See "Options and Optional Equipment" for color options.
6.5.	Axle assembly	2000 lb. (907kg) capacity, 5 on 4.5" B.C. idler hub
6.6.	Springs	Double-eye leaf springs
6.7.	Tires	ST205/75D15 steel-belted trailer tires, load rating B
6.8.	Drawbar	
6.8.1.	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 (12mm) diameter bolts.
6.8.2.	Material	Square tubing, 3" x 3/16" wall (7.62cm x 0.476cm wall)
6.8.3.	Jack	Top-wind swivel, 800-lb. (363kg) capacity with caster wheel to make moving trailer easier
6.8.4.	Tow hitch	Standard 2-inch ball coupler tow-hitch, SAE Class 2, 3500-lb. (1588kg) capacity. Bolts to drawbar, removable and replaceable. See "Options and Optional Equipment" for tow-hitch options.
6.8.5.	Tow chains	Two high-test proof coil chain assemblies, with "latching" S-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)

6.9.	Stabilizer jacks	Four swivel jacks, each with 2000-lb. (907kg) capacity, mounted on corners of trailer frame
6.10.	Wind resistance	In the deployed position, the maximum sustainable wind speed before overturning, when supported by the standard jack stands with tires off the ground, is 50 mph (80km/h)

6.11.	Wiring	
6.11.1.	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
6.11.2.	Trailer plug	A sealed, molded, 4-square connector plugs into harness under trailer
6.11.3.	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
6.11.4.	Protection	All trailer wiring encased in UV protective loom, and attached with P-clamp riveted to trailer frame; no exposed wires
6.12.	Taillights	
6.12.1.	Type	Two oval-shaped, sealed, combination stop, turn and taillights
6.12.2.	Location	Mounted to top of trailer deck behind fenders
6.12.3.	Mounting	No screws used for mounting; bracket is welded to trailer frame; each light held in place and sealed with snap-in rubber grommet
6.13.	License plate	A lighted license plate light holder is mounted to rear trailer frame
6.14.	Reflectors	Sides of trailer have amber reflectors near front and red reflectors near rear
		See "Options and Optional Equipment" for reflective tape
6.15.	Tower assembly	
6.15.1.	Function	Sign cabinet is raised and lowered on a telescoping tower
6.15.2.	Tower construction	Two sections of square steel tubing with the inner section telescoping inside the outer section. The inner section is zinc plated to prevent corrosion.
		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.
6.15.3.	Swivel base	A steel tubular weldment is bolted to the trailer frame. The outer tower section rotates on a thrust bearing and washers inside the swivel base, reducing rotating friction.
6.15.4.	Height	At fully deployed height, 84" (213cm) from ground to bottom of display cabinet
6.15.5.	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.

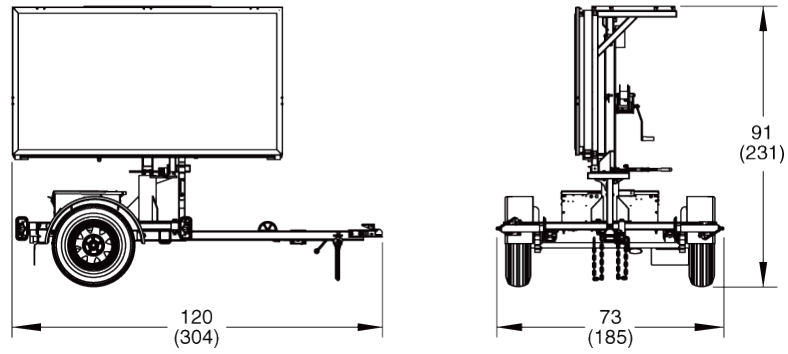| 6.15.6. | Winch assembly | Function | Hand-operated winch raises and lowers sign cabinet |
		Capacity	1500 lbs. (680kg)
		Brake	Safety friction-brake prevents display cabinet from falling if operator looses grip on winch handle
		Cable	1/4" (6.35mm) diameter galvanized aircraft cable
6.15.7.	Rotation		Sign rotates by hand, pivoting 360 degrees on tower
6.15.8.	Rotation lock		Sign rotation is locked with an adjustable lever that operates a mechanical friction caliper and disk brake. The ½-inch thick, round, zinc-plated brake disk is bolted to the outer tower section.
6.15.9.	Sight tube		A sight tube for aiming the message sign in desired direction is mounted to the underside of the display cabinet frame

7.   POWER SYSTEM

7.1.	Description		Electronics powered by batteries, which are charged automatically with integrated solar charging system
7.2.	Battery box		
7.2.1.	Function		Holds batteries and remote charger
			See "Options and Optional Equipment" for heavy-duty secure battery box
7.2.2.	Construction		Riveted all-steel construction All parts 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
7.2.3.	Location		Centered over axle on between fenders, bolted to trailer frame
7.3.	Batteries		
7.3.1.	Description		Three 4D AGM 12Vdc batteries
			See "Options and Optional Equipment" for battery options
7.3.2.	Features		100% maintenance-free
			Sealed and spill-proof
			Faster recharge and greater freeze resistance than conventional batteries
			Contains less lead than conventional batteries
7.3.3.	Voltage		12Vdc each

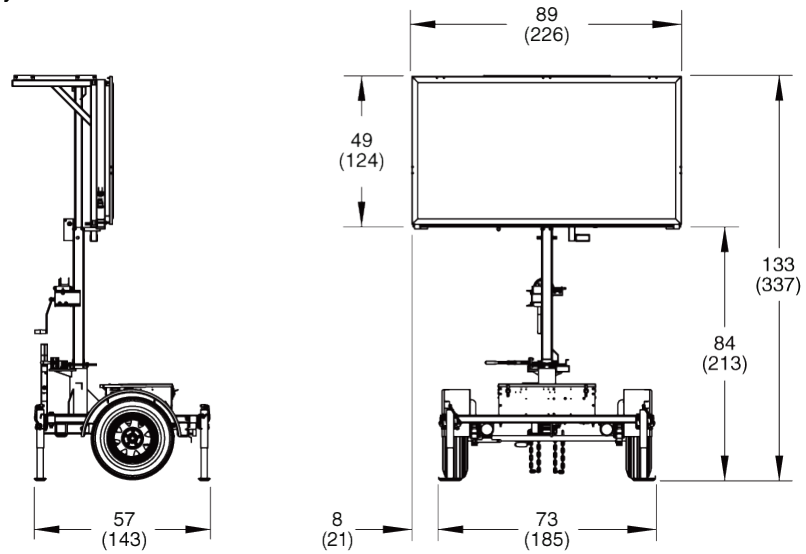| 7.3.4.	Weight	Approx. 160 lbs. (72kg) each
7.3.5.	Capacity	600 Ah total
7.4.	Remote charger	
7.5.	Function	Plugs into a standard commercial power source to recharge batteries if battery voltage drops due to lack of sun for automated solar charging system
7.5.1.	Type	12-volt battery charger
7.5.2.	Location	Inside battery box, mounted to divider panel on opposite side from batteries
7.5.3.	Output capacity	45A
7.5.4.	Output voltage	13.4Vdc @ full load 13.6Vdc standard float voltage 14.2Vdc with dual-voltage jack installed
7.5.5.	Input voltage	108 to 132Vac, standard three-prong plug
7.5.6.	Input frequency	50 to 60 Hz
7.5.7.	Cooling	Automatic fan cooling
7.6.	Solar	
7.6.1.	Panels	Two high-efficiency multi-crystal photovoltaic solar modules
7.6.2.	Location	Behind message sign, over tower. Solar panel array lies flat, rises and rotates with message sign. No shadowing effect on any trailer component.
7.6.3.	Power output	130W per solar panel 260W total
7.6.4.	Current	9.5A max. system current 10.3A open short-circuit current
7.6.5.	Voltage	17.9Vdc max. 21.8Vdc open short-circuit voltage
7.6.6.	Regulation	Solar panels regulated by computer power board
7.6.7.	Security	Solar panel array bolted to message sign frame with security screws and special security nut. Tool for security screws mounted inside battery box.

8.   DIMENSIONS & WEIGHT

8.1.   Dimensions   *inches*
                                          (cm)

Travel position

120
(304)

91
(231)

73
(185)

Deployed

89
(226)

49
(124)

133
(337)

84
(213)

57
(143)

8
(21)

73
(185)

8.2.   Weight   Approx. 1620 lbs. (735kg)

9.   OPTIONS AND OPTIONAL EQUIPMENT

9.1.   **Tow hitch**   Combo-hitch for pintle hook and 2-inch ball hitch

Heavy-duty lunette ring, 2½" ID x 1⅝" cross-section

9.2.   **Tow-vehicle plug**   Many types of plugs available, prewired at the factory; contact factory for details

9.3.   **Power**

9.3.1.   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

Options   One additional 4D AGM batteries, 200Ah additional capacity

Two additional 4D AGM batteries, 400Ah additional capacity

Four additional 4D AGM batteries, 800Ah additional capacity

9.3.2.   6-volt batteries   Replace standard batteries with lighter-weight 6Vdc batteries, wired in parallel and series for a 12-volt system

Options   Six Group 24 AGM 6Vdc batteries, 645Ah total capacity

Eight Group 24 AGM 6Vdc batteries, 860Ah total capacity

Weight   Approx. 60 lbs. (26kg) each

9.3.3.   Remote charger   When required for added battery charging capacity, replace standard remote charger with 75-amp charger

9.4.   **Secure battery box**

9.4.1.   Battery box   High-security battery box features heavy-gauge steel lid, hidden hinges, and heavy-duty hidden-shackle padlocks. Replaces standard battery box.

9.4.2.   Crossbar   Optional heavy-duty, lockable crossbar fits over top of secure battery box, preventing lid from opening

9.5.   **Taillights**

9.5.1.   Dual sealed-bulb   Dual sealed-bulb taillights replace standard sealed-bulb taillights

Requires SAE J560 7-pole round-pin trailer plug to replace standard trailer plug

9.5.2.   Single LED   Single LED taillights replace standard sealed-bulb taillights

9.5.3.   Dual LED   Dual LED taillights replace standard sealed-bulb taillights

Requires SAE J560 7-pole round-pin trailer plug to replace standard trailer plug

9.6.   **Reflective tape**   Reflective red-and-white conspicuity tape across rear trailer frame for increased visibility

9.7.   **Finish color**   Specify power-coat color and, if applicable, color scheme

9.8.   Radar-based speed monitoring system

9.8.1.	Description	Approach-only radar senses the largest moving mass moving toward it. The message sign conveys a user-selected message to the motorist.
9.8.2.	Band	K-band transmitter
9.8.3.	Location	Radar head located on the bottom of the message sign display cabinet, just off-center, for maximum effectiveness regardless of which side of the road the trailer is being used
9.8.4.	Enclosure	Radar head is sealed to withstand the elements, while an aluminum cover goes over the head unit for impact resistance
9.8.5.	Standards compliance	FCC approved CE compliant
9.8.6.	Distance range	1000 ft. @ 5 to 85 mph (305m @ 8 to 137km/h)
9.8.7.	Speed range	5 to 99 mph (8 to 222km/h)
9.8.8.	Accuracy	±1 mph from 5 to 40 mph, ±2 mph from 40 to 100 mph (±1.6km/h from 8 to 64km/h, ±3.2 from 64 to 161km/h)
9.8.9.	Frequency	24.150 ± 0.05 GHz
9.8.10.	Electrical protection	Fused and reverse-polarity protected
9.8.11.	Calibration	Radar is factory calibrated; a tuning fork for verifying radar is operating correctly is attached inside the control cabinet door; when struck and held in front of the radar head, the tuning fork vibrations simulate 55 mph

9.9.   Cellular modem package

9.9.1.	Purpose		The remote communications package enables the message sign to be controlled from remote locations away from the message sign, using an Internet-connected computer, tablet, or smartphone. Includes all of the items described below.
9.9.2.	Remote NTCIP central control software	Description	Easy-to-use program connects a computer to an individual message sign via an Internet connection. Used for changing messages, checking on trailer health status (such as battery voltages), viewing GPS locations, and setting message schedules.
		System requirements	Microsoft® Windows® (most versions) .NET framework Internet connection
9.9.3.	Web-based remote control	Description	Using a standard Web browser, allows connection to an individual message sign without software. Ideal for smartphone users.

		System requirements	Modern standards-compliant Web browser (such as Mozilla® Firefox®, Microsoft Internet Explorer® 7, Opera™, or Safari®) with JavaScript enabled
			A platform that supports one of these browsers (smartphone, laptop computer, or desktop computer)
			Internet connection
9.9.4.	Wanco Fleet Manager	Description	Web-based application for managing even the most diverse message sign fleets
		Features	Add or remove equipment to groups for quick access, ideal for managing contractor rentals or entire projects all at once
			Map GPS locations of entire message sign fleet simultaneously
			Record vital information from signs, such as message changed by user and date, battery and solar voltages, and equipment alarms
			Mass broadcast capability, perfect for Amber Alerts and emergencies
		System requirements	Modern standards-compliant Web browser (such as Mozilla Firefox, Microsoft Internet Explorer 7, Opera, or Safari)
			A platform that supports one of these browsers (laptop or desktop computer)
			Internet connection
9.9.5.	Cellular plans	User provided	User obtains cellular data plan from, and makes monthly payments to, service provider. Wanco programs modem according to user-provided specifications at time of modem purchase. Wanco tests modem setup.
		Wanco cellular service	Wanco provides Verizon® cellular service without activation charges, monthly payments, or overage charges. User makes a single payment annually to Wanco. For increased security, Wanco hosts the service on a virtual private network (VPN).
9.9.6.	Modem		Compact industrial cellular gateway
			Optional modems available; contact factory for details
		Carriers	Approved for use on Verizon, AT&T®, Sprint®, Rogers™, Bell™, and Telus®
		Security	Latest levels in security, IP sec, SSL, and GRE VPN client
		Power	Input voltages range: 7 to 28Vdc
			Typical power consumption: 250mA @ 12Vdc
		Operating temperature	−22 to 158°F (−30 to 70°C)

9.9.7.   Antenna   Low-profile dual-function GSM/GPS

Location   Installed at highest point on message sign

GPS L1 antenna   1575.42 ±3 MHz center frequency <15mA @ 3 to 5V

GSM antenna   Dual band, 824 to 896 MHz and 1710 to 1990 MHz

Connectors   SMA connectors for GSM and GPS antennas

9.10.   Traffic Data Classifier System

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

9.10.2.   Direction   Registers both approaching and receding vehicles

9.10.3.   Traffic lanes   Most effective for 2-lane roads

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

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

9.10.6.   Units   English or metric

9.10.7.   Time stamp   Yr,Mo,Dy,Hr,Min,Sec.

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

9.10.9.   Sensor   Microwave K-band 24.125 GHz

9.10.10.   Power   Uses radar-speed sign power supply

9.10.11.   Power output   20 dbm (EIRP)

9.10.12.   Current   110 mA

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

9.10.14.   Internal memory 1MB (1,048,576 bytes)

9.10.15.   Baud rate   9600, 8 bit, no parity

9.10.16.   Calibration   Self-calibrating

9.10.17.   Installation   Automatically positioned horizontally when trailer is level; adjustable bracket allows user to point toward traffic at a 45-degree angle

9.11.   RemoteUI control software

9.11.1.	Description	The Wanco RemoteUI program allows operators to control the message board using a laptop computer or touchscreen device. The computer must be connected to the message sign; wireless access is not recommended.
9.11.2.	Fleet limits	Connects to one sign at a time; maximum number of signs is unlimited
9.11.3.	Security	Multi-level password protection
9.11.4.	System requirements	Microsoft Windows (most versions) or Unix® operating system

EXHIBIT A: MESSAGE FONTS

Font 1

5 x 7 pixels

7.68" x 10.98" (195 x 279mm)

Standard fixed-width font with lower-case letters

3 lines of 8 characters, maximum

Font 2

5 x 8 pixels

7.68" x 12.64" (195 x 321mm)

Tall fixed-width font with lower-case letters

3 lines of 6 characters, maximum

Font 3

6 x 9 pixels

9.33" x 14.29" (237 x 363mm)

Bold proportional font with 4x9-pixel capitals for lower-case letters

2 lines of 7 characters, typical

Font 4

6 x 11 pixels

9.33" x 17.60" (237 x 447mm)

Bold proportional font with lower-case letters and accented characters

2 lines of 7 characters, typical

Font 5

6 x 11 pixels

9.33" x 17.60" (237 x 447mm)

Bold proportional font with lower-case letters, accented characters, and increased spacing

2 lines of 6 characters, typical

Font 6

5 x 12 pixels

7.68" x 19.25" (195 x 489mm)

Tall fixed-width font with 5x8-pixel capitals for lower-case letters

1 line of 8 characters, maximum

Font 7

7 x 12 pixels

10.98" x 19.25" (279 x 489mm)

Bold fixed-width font with 6x8-pixel capitals for lower-case letters

1 line of 6 characters, maximum

Font 8

7 x 23 pixels

10.98" x 37.44" (279 x 951mm)

Large fixed-width font with 6x14-pixel capitals for lower-case letters

1 line of 6 characters, maximum

Font 9

11 x 23 pixels

17.60" x 37.44" (447 x 951mm)

Large bold fixed-width font, capitals only (no lower-case letters)

1 line of 4 characters, maximum

Font 10

4 x 5 pixels

6.02" x 7.68" (153 x 195mm)

Mini proportional font with limited lower-case

4 lines of 10 characters, typical

Font 11

7 x 10 pixels

10.98" x 15.95" (279 x 405mm)

Large fixed-width font, capitals only (no lower-case letters)

2 lines of 5 characters, maximum

Font 12

9 x 14 pixels

14.29" x 22.56" (363 x 573mm)

Large bold fixed-width font, capitals only (no lower-case letters)

1 line of 4 characters, maximum

EXHIBIT B: ARROW BOARD FUNCTIONS

Flashing patterns

 Flashing left or right arrow

 Flashing double arrow

 Flashing four-corner warning

 Flashing caution-bar warning

Sequential patterns

 Sequencing left or right arrow

 Sequencing left or right stem arrow

 Sequencing left or right chevron arrows

 Alternating diamonds