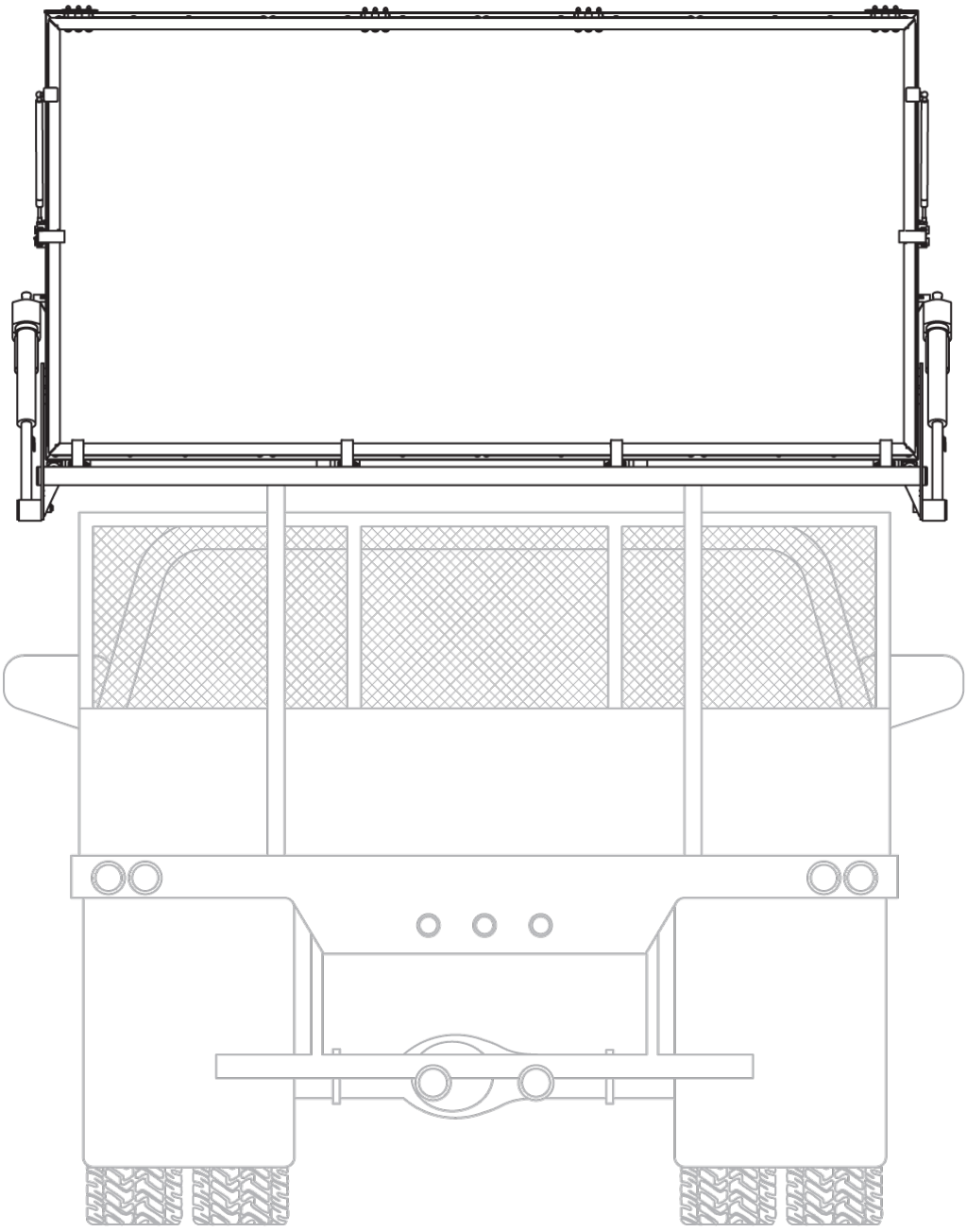
MESSAGE SIGNS FOR LARGE TRUCKS

MODEL WMBV
PRODUCT SPECIFICATIONS | JULY 2023



1. DESCRIPTION

1.1. Description

Wanco Truck-Mount Message Signs for large trucks feature a full matrix of LEDs for displaying highly legible messages from a moving or parked truck or other vehicle. The vehicle can move with a convoy while displaying the same detailed information that a stationary trailer or overhead changeable message sign would provide.

These signs feature Wanco's high-efficiency LEDs for reduced energy consumption, superior performance, and outstanding legibility. The full-matrix display can present messages as text, graphics, or a combination of both. Preprogrammed messages and graphics include a selection of bold arrow patterns. Creating custom messages is easy.

The message sign's touchscreen controller is installed inside the vehicle cab. The controller is easy to use, and continuously shows the message displayed on the sign. A laptop or external controller is unnecessary.

An integrated low-profile tilt-frame is operated using the touchscreen controller. When the tilt-frame is raised to vertical, the sign displays messages to motorists. When lowered to horizontal, the sign and frame have a low profile.

Power is provided by the vehicle power system.

1.2. Models

1.2.1.	WMBV-LF	Matrix message sign for large trucks, with large display and 90-degree tilt-frame
1.2.2.	WMBV-MF	Matrix message sign for large trucks, with medium-size display and 90-degree tilt-frame

2. FEATURES

2.1. Installation

- Sign with integrated tilt-frame installed as a single unit
- Can be installed in a truck bed or over the cab
- Wiring harnesses for simple cable connections

2.2. Operation

- Full-matrix display shows text, graphics or both
- Preprogrammed arrow patterns
- Preprogrammed text messages, symbols and graphics
- Multiple alphanumeric fonts
- High-efficiency LED characters are bright, clear and legible
- Energy-efficient operation reduces strain on vehicle batteries
- Sign and tilt-frame operated from inside vehicle cab
- Built-in RF immunity ensures reliable performance
- Full-color touchscreen controller with high-resolution display installed inside cab
- Continuous message preview on controller main screen
- Enhanced main screen provides "single click" for many common functions
- Multi-level password protection restricts access to control software
- NTCIP compliant

2.3. Maintenance

- Controller provides access to diagnostic information
- Display cabinet door props open for servicing
- Individual display modules can be replaced easily
- Durable powder-coat finish resists the elements

2.4. Application

Vehicle-mount signs are ideal for the following applications:

- Road striping convoys
- Snow removal convoys
- Road sweeping convoys
- Pothole repairs
- Crash cushion (TMA) trucks

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.

3.1.2. Size

Large display 97 1/8" x 48 5/8" x 4" (246.7 x 123.5 x 10.2cm) W x H x D

Medium display 82 1/8" x 48 5/8" x 4" (208.6 x 123.5 x 10.2 cm) W x H x D

3.1.3. Material

Aluminum sheet, 5052-H32, 0.062" (1.575mm) thick

3.1.4. Construction

Fabricated one-piece shell with watertight welded corners. Internal ribs and steel reinforced corners add rigidity and strength.

3.1.5. Door

Cabinet door frame is welded structural steel tubing with sheet metal window brackets along outside edges. 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 cabinet.

When sign is in upright position, door fully opens to service the sign cabinet interior. Two gas springs, one on each side of the cabinet, hold door open.

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

Power cable from vehicle auxiliary 12Vdc power, switched to display cabinet

Data cable from controller to display cabinet: Cat 5e shielded, outdoor rated, RJ45 connectors

(for system wiring, see Exhibit C)

3.1.8. Storage

When fully lowered for storage and transport, display cabinet is held stable and secure

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
		Replacement	Each module can be exchanged in less than two minutes using a 5/16-inch nut driver socket or slotted screwdriver
		Size	21.75" (55.3cm) wide by 12.375" (31.4cm) 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
3.2.3.	Pixels	Four LEDs form a “pixel”	
		Pixel size	1" x 1" (25.4 x 25.4mm)
		Full matrix	Large sign: 56 pixels wide by 28 pixels high, 1568 pixels total
			Medium sign: 48 pixels wide by 28 pixels high, 1344 pixels total
		Display module	8 pixels wide by 14 high, 112 pixels total
		Pixel pitch	1.568" (39.83mm), 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
		Current	100 mA peak-pulsed forward current
		Temperature limits	Operating temperature, –40 to 212°F (–40 to 100°C)
3.2.5.	Viewing angle	Total viewing area, 30 degrees	
3.2.6.	Brightness	Factory preset for optimal viewing and power consumption	
3.2.7.	Auto dimming	A photocell mounted inside the sign cabinet detects 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	
3.2.8.	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, preventing the message from shifting due to an individual module failure.
		Pixel test	Each module is equipped with individual pixel failure notification
3.2.9.	Fonts	12 fonts	
		See Exhibit A for font samples and additional font information	
		Default size	5 x 8 pixels (W x H), 7.25" x 12" (185 x 304mm) Large sign: 3 lines of 9 characters per line, maximum Medium sign: 3 lines of 7 characters per line, maximum
		Smallest size	4 x 5 pixels (W x H)
		Largest size	11 x 23 pixels (W x H)
		Other sizes	See Exhibit A
3.3.	Tilt-frame		
3.3.1.	Description	Low-profile tit-frame is integrated with display cabinet, designed for installation on rigid support above vehicle cab or on truck bed Electrically operated, the tilt-frame allows the sign to be lowered into a horizontal (flat) position when not in use, for transport and storage; and raised to a vertical (upright) position when in use	
3.3.2.	Material	All-welded formed and structural steel	

3.3.3.	Finish	Frame is coated with oven-baked, flat black powder-coat finish to ensure durability and corrosion protection. Assembly is high-pressure phosphate washed prior to finish coat.
3.3.4.	Actuator	Dual electric actuators operate tilt-frame, allowing sign display to be raised and lowered Capacity, 500 lb (226.8kg)

4. CONTROL SYSTEM

4.1.	Description	Self-contained onboard computer, comprised of a power control unit (PCU) located behind display modules inside message sign display cabinet, and a display control unit (DCU) inside the controller housing.
4.2.	Controller	
4.2.1.	Description	Touchscreen interface 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 remains active while power is engaged; sleep mode can be configured by the user if needed
		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 Message on sign always shown on main screen and menus screen Enhanced main screen (see Exhibit D for sample screens)
		Enhanced main screen	Provides “single click” function for: • Instantaneous activation of any of three user-defined messages • Choosing a message from predefined and user-configurable sets of messages; up to 12 message choices visible on a single screen • Choosing to create, modify, or display a message • Blanking the message sign • Full control of tilt-frame operation; icon indicates tilt position • Accessing control system menus

		Tilt-frame control	Main screen includes virtual buttons for controlling message sign tilt-frame: tilt-up, tilt-down, and instant-stop Two tilt modes are selectable: auto-tilt (momentary button press) and manual tilt (continuous button press) When the sign is in travel position and the user activates a message, the tilt-frame automatically raises the sign to the deployed position When the user causes the tilt-frame to lower the sign to the travel position, the sign is automatically blanked
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.	Mounting bracket	Designed for installation inside vehicle cab; typically installed on the dashboard Adjustable tilt bracket holds controller in place See “Options and Optional Equipment” for pedestal mount	
4.2.5.	Wiring	One Ethernet cable from message sign for communications Power cable from vehicle auxiliary 12Vdc power, switched to controller (for system wiring, see Exhibit C)	
4.2.6.	Power	Power supplied by vehicle power system Push-button switch on bottom of housing provides manual on/off control Controller shuts down when vehicle power is switched off	
4.2.7.	Weight	1.6 lb (0.73kg)	
4.2.8.	Temperature limits	–4 to 158°F (–20 to 70°C)	
4.3.	PC boards		
4.3.1.	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.	
4.3.2.	Temperature limits	–4 to 176°F (–20 to 80°C)	
4.3.3.	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 programming	Extremely easy to program	
		WYSIWYG (What You See Is What You Get) while programming	
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
		Blank	Easy sign blanking
4.4.5.	Text alignment	Selectable: left, center, or right; and top, middle, or bottom	
4.4.6.	Fonts	Selectable: see Exhibit A	
4.4.7.	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	
4.4.8.	Message pages	Maximum 10 sequential “pages” per message, sequencing speed from 0.1 to 25.5 sec.	
4.4.9.	Scheduling	Real-time clock and calendar with DST control	
4.4.10.	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 stem arrow Sequencing left or right walking arrow Sequencing left or right chevron arrows Alternating diamonds (for samples, see Exhibit B)
		Bold graphics	Each arrow and bar is 5 pixels wide
4.4.11.	Configuration	Menus provide access to all message sign configuration settings	
4.4.12.	Troubleshooting	System status on main screen, detailed status and diagnostic menus provide additional message sign information to assist in troubleshooting	
4.4.13.	Tilt-frame	Tilt-frame actuator is software controlled	

5. POWER SUPPLY

5.1.	Description	Message display, controller, and tilt-frame actuator are powered by vehicle power system
5.2.	Load	Maximum 14.7A @ 13.6Vdc
5.3.	Voltage	Minimum 11.0Vdc Maximum 18.0Vdc

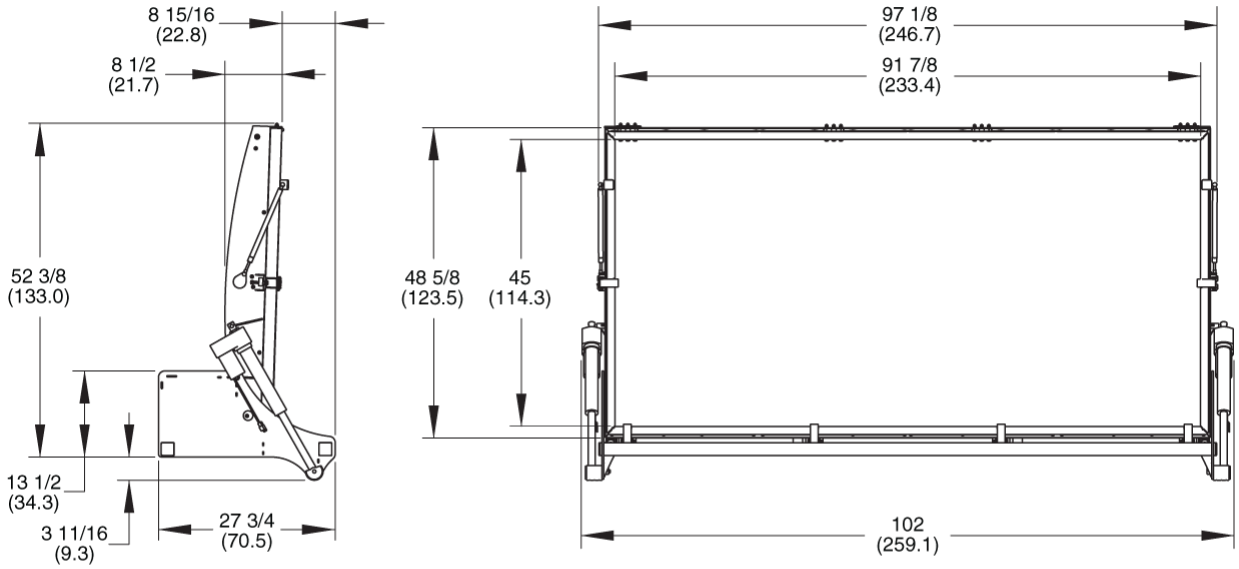
6. DIMENSIONS & WEIGHT

6.1. Dimensions

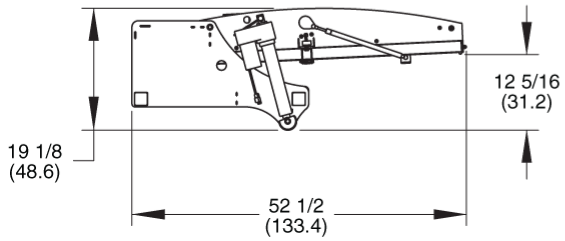
6.1.1. Large sign

inches
(cm)

Deployed



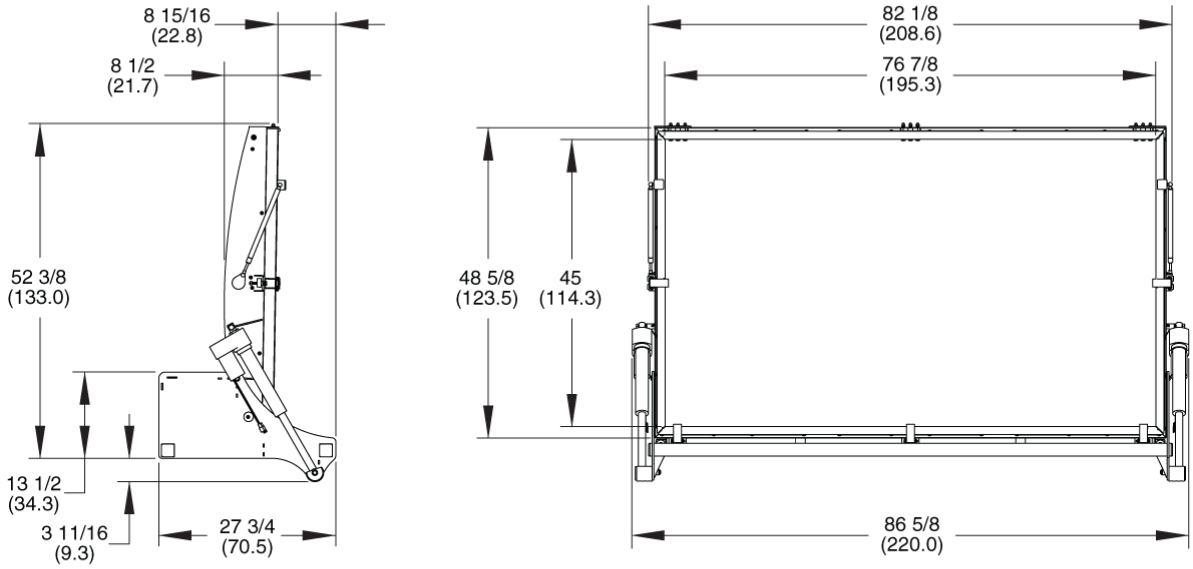
Travel position



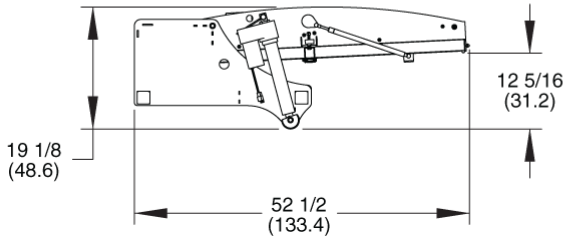
6.1.2. Medium sign

inches
(cm)

Deployed

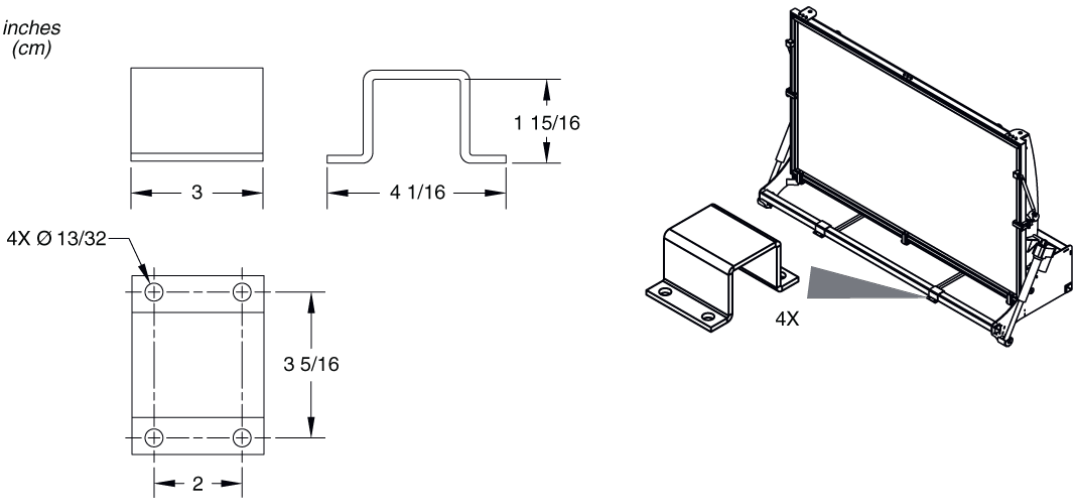


Travel position

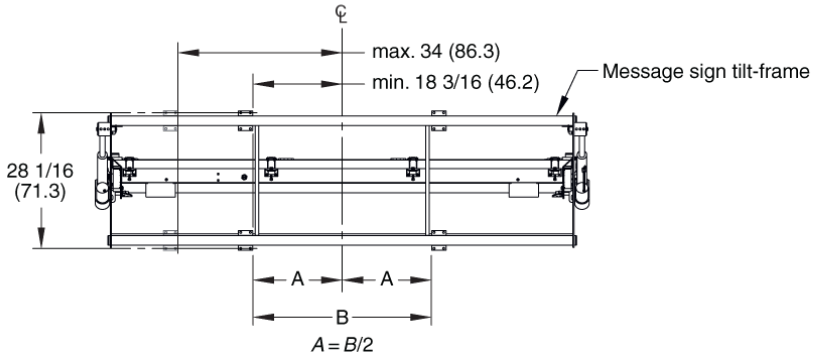


6.1.3. Mounting

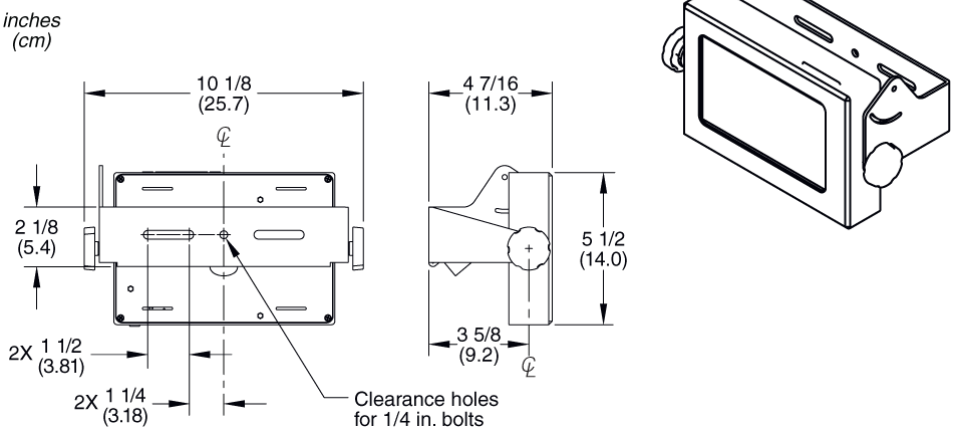
Mounting "hat" brackets



Message sign and tilt frame—bottom view



Dashboard controller bracket



6.2. Weight

6.2.1. Large sign Approx. 390 lb (177kg) with integral tilt-frame

6.2.2. Medium sign Approx. 340 lb (154kg) with integral tilt-frame

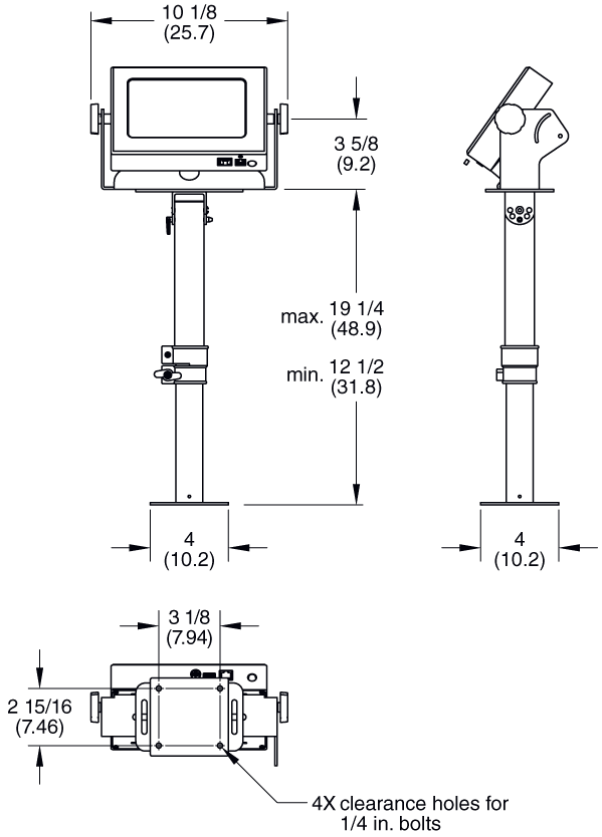
7. OPTIONS AND OPTIONAL EQUIPMENT

7.1. Pedestal mount for controller

7.1.1. Description — Pedestal/post mount for installing controller off vehicle cab floor

7.1.2. Dimensions

inches (cm)



7.2. Truck-bed mounting frame for message sign

7.2.1.	Description	For use with pickup and flatbed trucks, mounting frame raises message sign off truck bed.
7.2.2.	Material	Structural steel frame with flat bar steel base for mounting
7.2.3.	Construction	All welded tubing; sides and crossbars bolted together for final assembly
7.2.4.	Finish	Frame is coated with oven-baked, flat black powder-coat finish to ensure durability and corrosion protection. Assembly is high-pressure phosphate washed prior to finish coat.
7.2.5.	Dimensions	

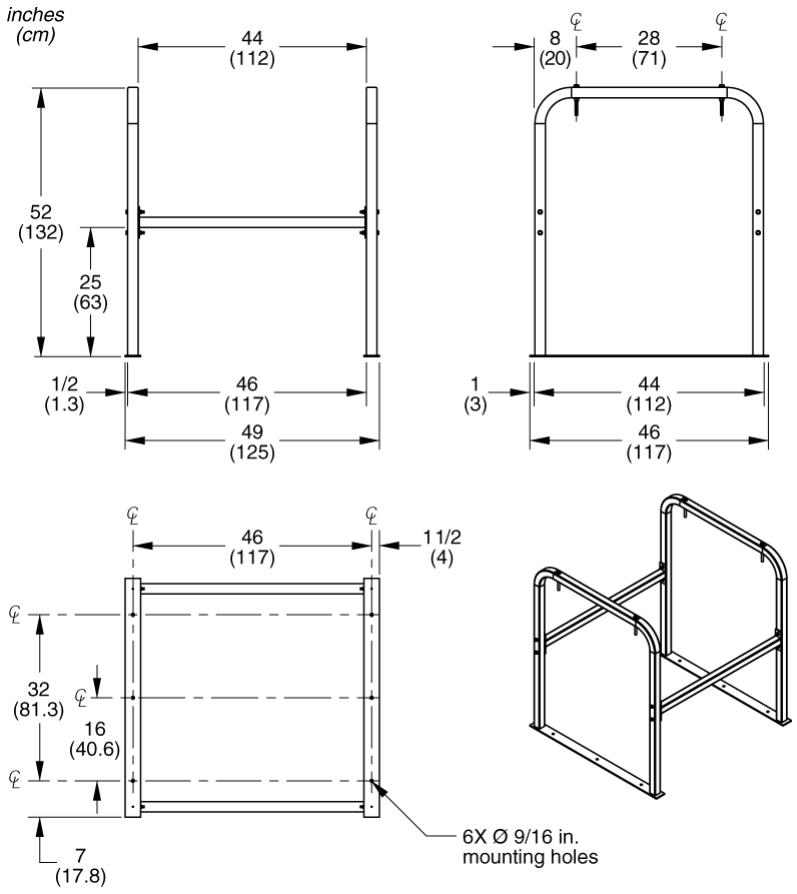


EXHIBIT A: MESSAGE FONTS

Large sign

Font 1
5 x 8 pixels
Equivalent size: 8.20" x 12.90" (208 x 328mm)
Physical size: 7.27" x 11.98" (185 x 304mm)
Standard fixed-width font with lowercase letters
3 lines of 9 characters, maximum

Font 2
5 x 8 pixels
Equivalent size: 8.20" x 12.90" (208 x 328mm)
Physical size: 7.27" x 11.98" (185 x 304mm)
Standard fixed-width font with lowercase letters and increased horizontal spacing
3 lines of 7 characters, maximum

Font 3
6 x 9 pixels
Equivalent size: 9.77" x 14.47" (248 x 368mm)
Physical size: 8.84" x 13.54" (225 x 344mm)
Bold proportional font with 4x9-pixel capitals for lowercase letters
2 lines of 8 characters, typical

Font 4
6 x 11 pixels
Equivalent size: 9.77" x 17.61" (248 x 447mm)
Physical size: 8.84" x 16.68" (225 x 424mm)
Bold proportional font with lowercase letters and accented characters
2 lines of 8 characters, typical

Font 5
6 x 11 pixels
Equivalent size: 9.77" x 17.61" (248 x 447mm)
Physical size: 8.84" x 16.68" (225 x 424mm)
Bold proportional font with lowercase letters, accented characters, and increased spacing
2 lines of 7 characters, typical

Font 6
5 x 12 pixels
Equivalent size: 8.20" x 19.18" (208 x 487mm)
Physical size: 7.27" x 18.25" (185 x 464mm)
Tall fixed-width font with 5x8-pixel capitals for lowercase letters
2 lines of 9 characters, maximum

Large sign *(continued)*

Font 7
7 x 12 pixels
Equivalent size: 11.34" x 19.18" (288 x 487mm)
Physical size: 10.41" x 18.25" (264 x 464mm)
Bold fixed-width font with 6x8-pixel capitals for lowercase letters
2 lines of 7 characters, maximum

Font 8
7 x 23 pixels
Equivalent size: 11.34" x 36.43" (288 x 925mm)
Physical size: 10.41" x 35.5" (264 x 902mm)
Large fixed-width font with 6x14-pixel capitals for lowercase letters
1 line of 7 characters, maximum

Font 9
11 x 23 pixels
Equivalent size: 17.61" x 36.43" (447 x 925mm)
Physical size: 16.68" x 35.5" (424 x 902mm)
Large bold fixed-width font, capitals only (no lowercase letters)
1 line of 4 characters, maximum

Font 10
4 x 5 pixels
Equivalent size: 6.63" x 8.20" (168 x 208mm)
Physical size: 5.70" x 7.27" (145 x 185mm)
Mini proportional font with limited lowercase
4 lines of 12 characters, typical

Font 11
7 x 10 pixels
Equivalent size: 11.34" x 16.04" (288 x 407mm)
Physical size: 10.41" x 15.11" (264 x 384mm)
Large fixed-width font, capitals only (no lowercase letters)
2 lines of 5 characters, maximum

Font 12
9 x 14 pixels
Equivalent size: 14.47" x 22.31" (368 x 567mm)
Physical size: 13.54" x 21.39" (344 x 543mm)
Large bold fixed-width font, capitals only (no lowercase letters)
1 lines of 4 characters, maximum

Medium sign

Font 1
5 x 8 pixels
Equivalent size: 8.20" x 12.90" (208 x 328mm)
Physical size: 7.27" x 11.98" (185 x 304mm)
Standard fixed-width font with lowercase letters
3 lines of 8 characters, maximum

Font 2
5 x 8 pixels
Equivalent size: 8.20" x 12.90" (208 x 328mm)
Physical size: 7.27" x 11.98" (185 x 304mm)
Standard fixed-width font with lowercase letters and increased horizontal spacing
3 lines of 6 characters, maximum

Font 3
6 x 9 pixels
Equivalent size: 9.77" x 14.47" (248 x 368mm)
Physical size: 8.84" x 13.54" (225 x 344mm)
Bold proportional font with 4x9-pixel capitals for lowercase letters
2 lines of 7 characters, typical

Font 4
6 x 11 pixels
Equivalent size: 9.77" x 17.61" (248 x 447mm)
Physical size: 8.84" x 16.68" (225 x 424mm)
Bold proportional font with lowercase letters and accented characters
2 lines of 7 characters, typical

Font 5
6 x 11 pixels
Equivalent size: 9.77" x 17.61" (248 x 447mm)
Physical size: 8.84" x 16.68" (225 x 424mm)
Bold proportional font with lowercase letters, accented characters, and increased spacing
2 lines of 6 characters, typical

Font 6
5 x 12 pixels
Equivalent size: 8.20" x 19.18" (208 x 487mm)
Physical size: 7.27" x 18.25" (185 x 464mm)
Tall fixed-width font with 5x8-pixel capitals for lowercase letters
2 lines of 8 characters, maximum

Medium sign *(continued)*

Font 7
7 x 12 pixels
Equivalent size: 11.34" x 19.18" (288 x 487mm)
Physical size: 10.41" x 18.25" (264 x 464mm)
Bold fixed-width font with 6x8-pixel capitals for lowercase letters
2 lines of 6 characters, maximum

Font 8
7 x 23 pixels
Equivalent size: 11.34" x 36.43" (288 x 925mm)
Physical size: 10.41" x 35.5" (264 x 902mm)
Large fixed-width font with 6x14-pixel capitals for lowercase letters
1 line of 6 characters, maximum

Font 9
11 x 23 pixels
Equivalent size: 17.61" x 36.43" (447 x 925mm)
Physical size: 16.68" x 35.5" (424 x 902mm)
Large bold fixed-width font, capitals only (no lowercase letters)
1 line of 4 characters, maximum

Font 10
4 x 5 pixels
Equivalent size: 6.63" x 8.20" (168 x 208mm)
Physical size: 5.70" x 7.27" (145 x 185mm)
Mini proportional font with limited lowercase
4 lines of 10 characters, typical

Font 11
7 x 10 pixels
Equivalent size: 11.34" x 16.04" (288 x 407mm)
Physical size: 10.41" x 15.11" (264 x 384mm)
Large fixed-width font, capitals only (no lowercase letters)
2 lines of 5 characters, maximum

Font 12
9 x 14 pixels
Equivalent size: 14.47" x 22.31" (368 x 567mm)
Physical size: 13.54" x 21.39" (344 x 543mm)
Large bold fixed-width font, capitals only (no lowercase letters)
1 lines 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 stem arrow

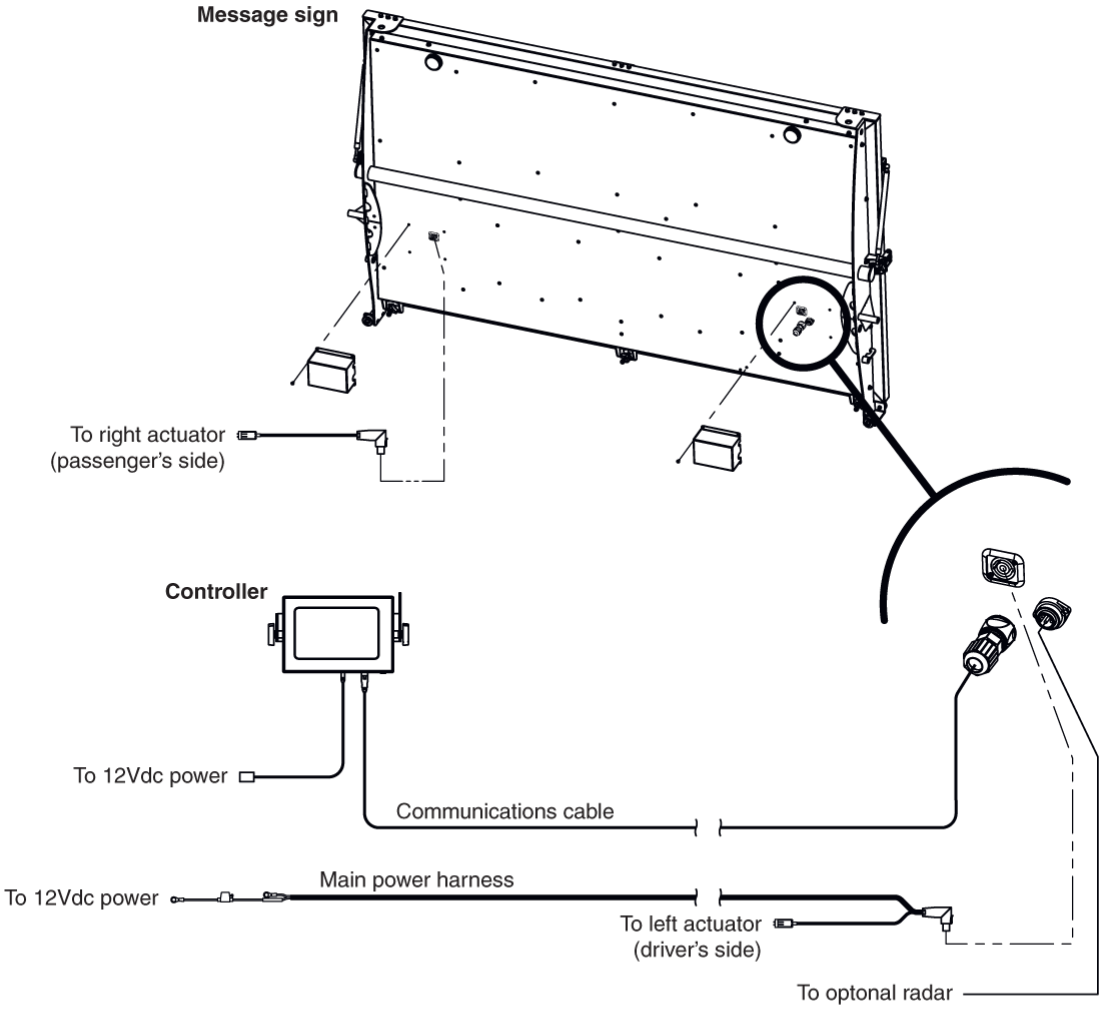
Sequencing left or right walking arrow

Sequencing left or right chevron arrows

Alternating diamonds

EXHIBIT C: SYSTEM WIRING

Overview



Detail view: Main power harness

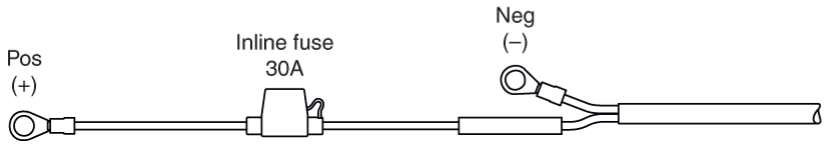
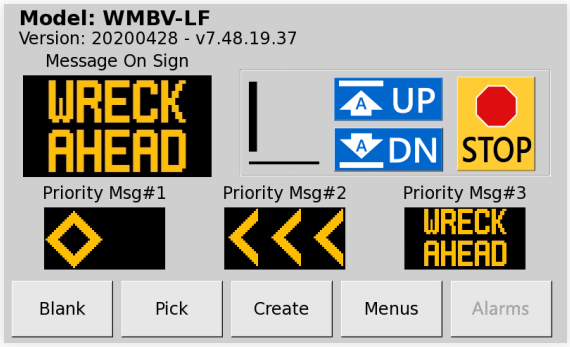


EXHIBIT D: USER-INTERFACE SAMPLE SCREENS

Main screen with "single click" functions, message display, and tilt control



Message "pick" screen—weather messages group