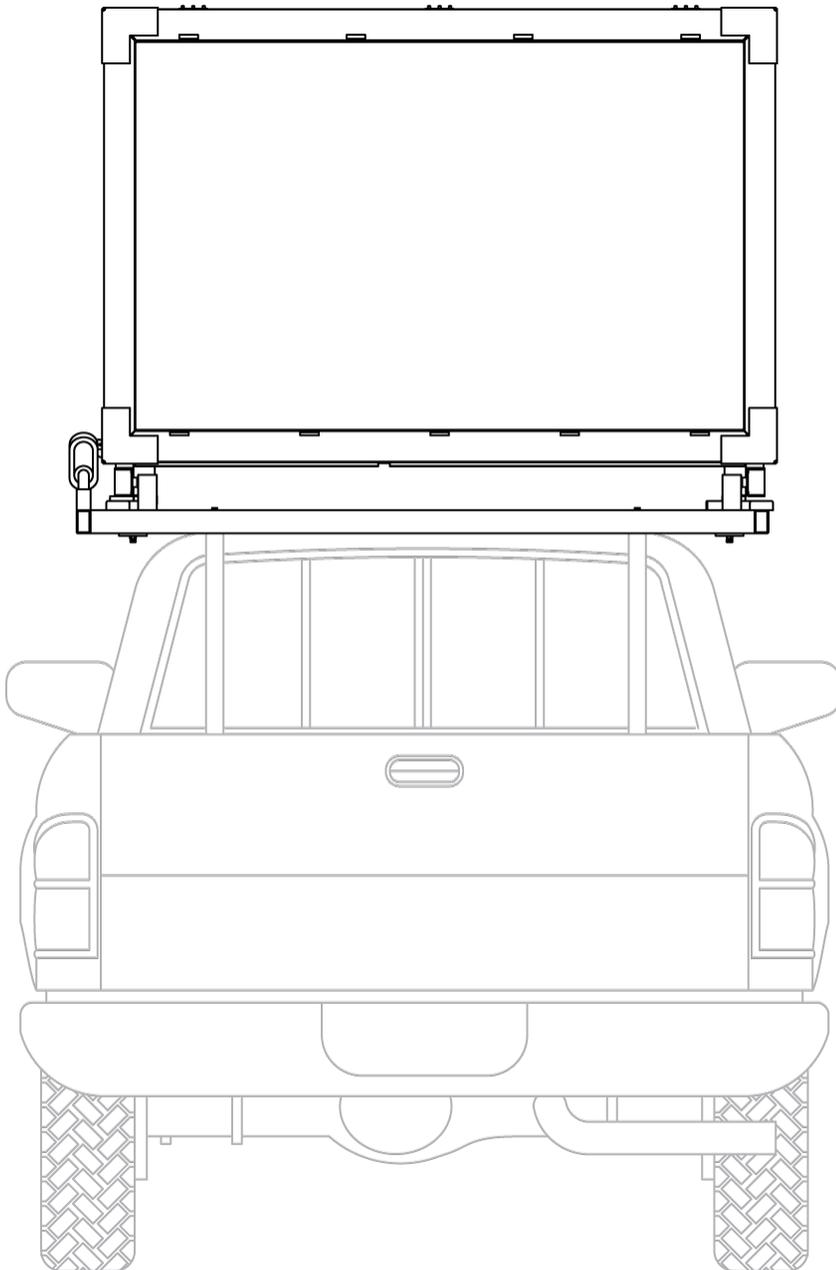


# MESSAGE SIGNS FOR SMALL TRUCKS

MODEL WVMB  
PRODUCT SPECIFICATIONS | JULY 2023



## 1. DESCRIPTION

- 1.1. Description
- Wanco Truck-Mount Message Signs for small trucks feature a full matrix of LEDs for displaying highly legible messages from a moving or parked 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 from inside the vehicle. When 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 truck’s alternator system.
- 1.2. Models
- 1.2.1. WVMB-3LP Matrix message sign for small trucks, with large display and 90-degree tilt-frame
- 1.2.2. WVMB-2LP Matrix message sign for small trucks, with small 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 extra-bold arrow patterns
  - Preprogrammed text messages, symbols and graphics
  - Multiple alphanumeric fonts
  - High-efficiency LED characters are bright, clear and legible
  - Optical lenses and sunshades increase visibility and improve performance
  - 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 and the door can be locked with user-supplied padlock.
- 3.1.2. Size
- |               |   |
|---------------|---|
| Large display | 73" x 49" x 6" (185 x 124 x 15cm) W x H x D |
| Small display | 73" x 37" x 6" (185 x 94 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 upright position, door fully opens to service the sign cabinet interior. Two prop rods, 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. 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.
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

3.2.3. Pixels

	Two LEDs form a “pixel”
Pixel size	0.75" x 0.75" (19 x 19mm)
Full matrix	Large sign: 48 pixels wide by 30 pixels high, 1440 pixels total  Small sign: 48 pixels wide by 20 pixels high, 960 pixels total
Display module	12 pixels wide by 10 high, 120 pixels total
Pixel pitch	34mm, horizontal and vertical

3.2.4.	LEDs	Technology	AllInGaP II (aluminum indium gallium phosphide) technology, T-1¼ 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.	Lenses and visors	<p>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.</p> <p>With lenses and visors, display is always bright and readable in all lighting conditions.</p> <p>These enhancements enable the message sign to operate with approximately half the power consumption of other message signs. As a result, the system is fully functional using less power.</p>	
3.2.6.	Viewing angle	Total viewing area with optical lenses, 50 degrees	
3.2.7.	Brightness	Factory preset for optimal viewing and power consumption	
3.2.8.	Auto dimming	<p>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</p> <p>Photocells are mounted inside the sign cabinet, one facing rear and one facing front</p>	
3.2.9.	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
3.2.10.	Fonts	<p>12 fonts</p> <p>See Exhibit A for font samples and additional font information</p>	
		Default size	<p>5 x 9 pixels (W x H), 6.80" x 12.15" (173 x 309mm)</p> <p>Large sign: 3 lines of 8 characters per line, maximum</p> <p>Small sign: 2 lines of 8 characters per line, maximum</p>
		Smallest size	4 x 5 pixels (W x H)
		Largest size	<p>Large sign: 11 x 23 pixels (W x H)</p> <p>Small sign: 9 x 14 pixels (W x H)</p>
		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 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 Electric actuator operates tilt-frame, allowing sign display to be raised and lowered  
Capacity, 1000 lbs. (453.6kg)

## 4. CONTROL SYSTEM

### 4.1. Computer

- 4.1.1. 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<br>800 x 480 pixels<br>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<br>Virtual keyboard appears when required for text entry<br>Multi-level password protection restricts access<br>Message on sign always shown on main screen and menus screen<br>Enhanced main screen<br>(see Exhibit D for sample screens) |

	Enhanced main screen	Provides “single click” function for: <ul style="list-style-type: none"> <li>• Instantaneous activation of any of three user-defined messages</li> <li>• Choosing a message from predefined and user-configurable sets of messages; up to 12 message choices visible on a single screen</li> <li>• Choosing to create, modify, or display a message</li> <li>• Blanking the message sign</li> <li>• Full control of tilt-frame operation; icon indicates tilt position</li> <li>• Accessing control system menus</li> </ul>	
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 lbs. (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	<table border="0"> <tr> <td style="vertical-align: top;">Quick-messages</td> <td style="vertical-align: top;">Easy quick-message activation</td> </tr> <tr> <td style="vertical-align: top;">Permanent</td> <td style="vertical-align: top;">Over 90 preprogrammed permanent messages, including arrows and FHWA standards</td> </tr> <tr> <td style="vertical-align: top;">Changeable</td> <td style="vertical-align: top;">250 changeable messages stored in NV flash</td> </tr> <tr> <td style="vertical-align: top;">Blank</td> <td style="vertical-align: top;">Easy sign blanking/power off</td> </tr> </table>	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/power off
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/power off									
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  <table border="0"> <tr> <td style="vertical-align: top;">Modes</td> <td style="vertical-align: top;">                             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)                         </td> </tr> <tr> <td style="vertical-align: top;">Bold graphics</td> <td style="vertical-align: top;">Each arrow and bar is 5 pixels wide</td> </tr> </table>	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				
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	Status and diagnostic menus provide 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                    Typical 8.4A @ 13.6Vdc  
                                  Maximum 24.6A @ 13.6Vdc
- 5.3. Voltage                Minimum 11.0Vdc  
                                  Maximum 18.0Vdc

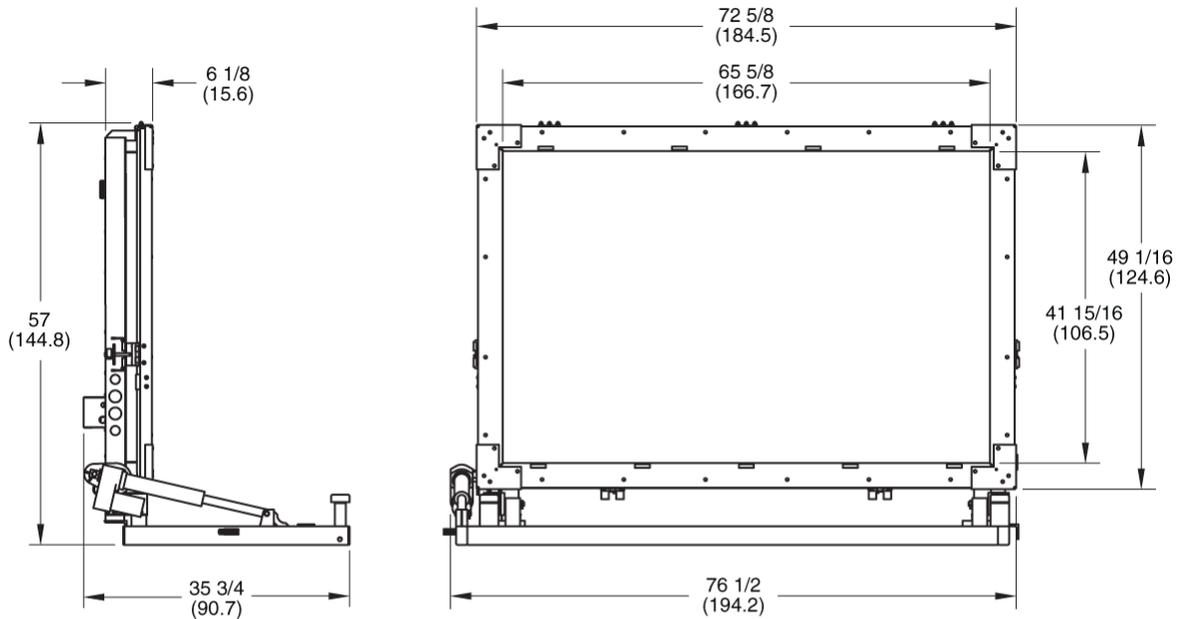
**6. DIMENSIONS & WEIGHT**

6.1. Dimensions

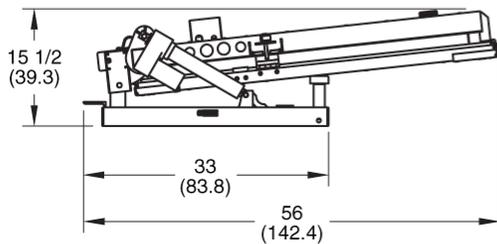
6.1.1. Large sign

*inches  
(cm)*

**Deployed**



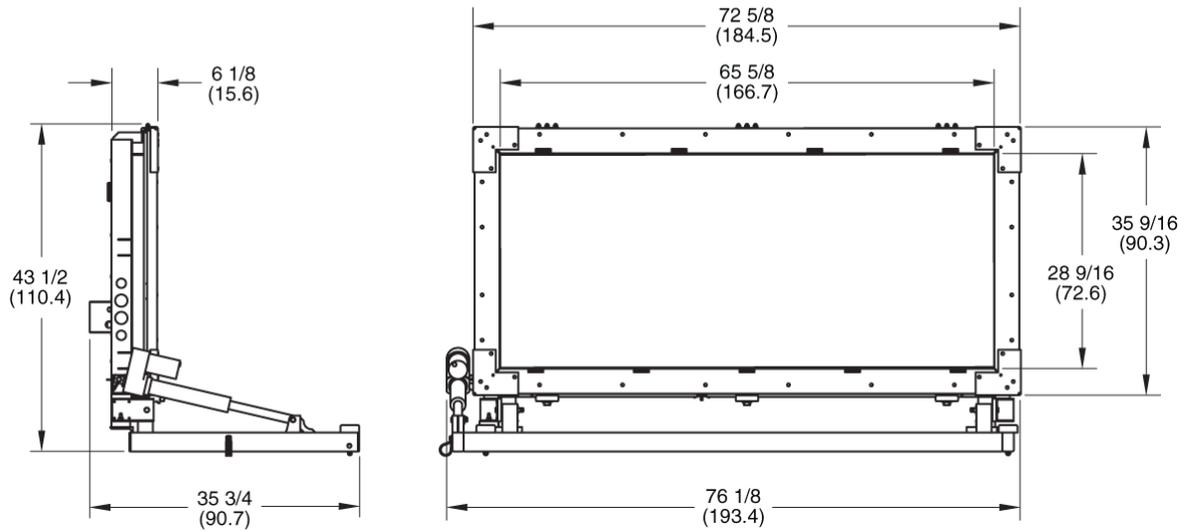
**Travel position**



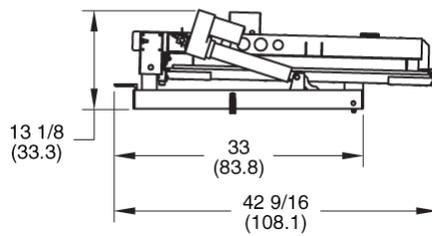
6.1.2. Small sign

inches  
(cm)

Deployed



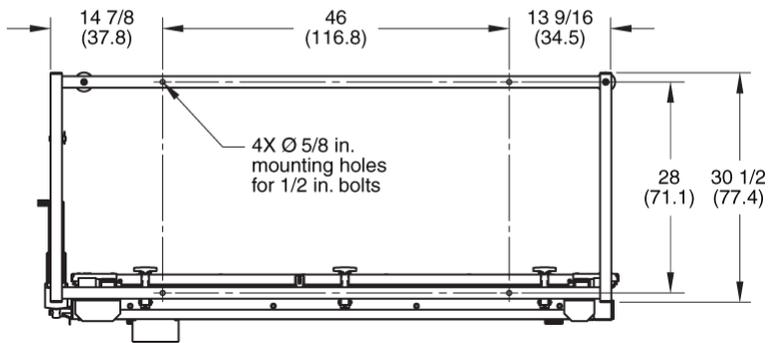
Travel Position



6.1.3. Mounting

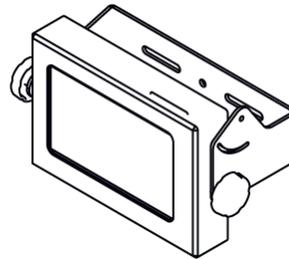
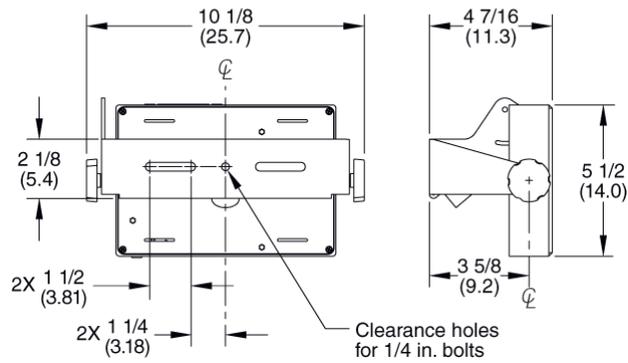
inches  
(cm)

Mounting holes



Dashboard controller bracket

inches  
(cm)



6.2. Weight

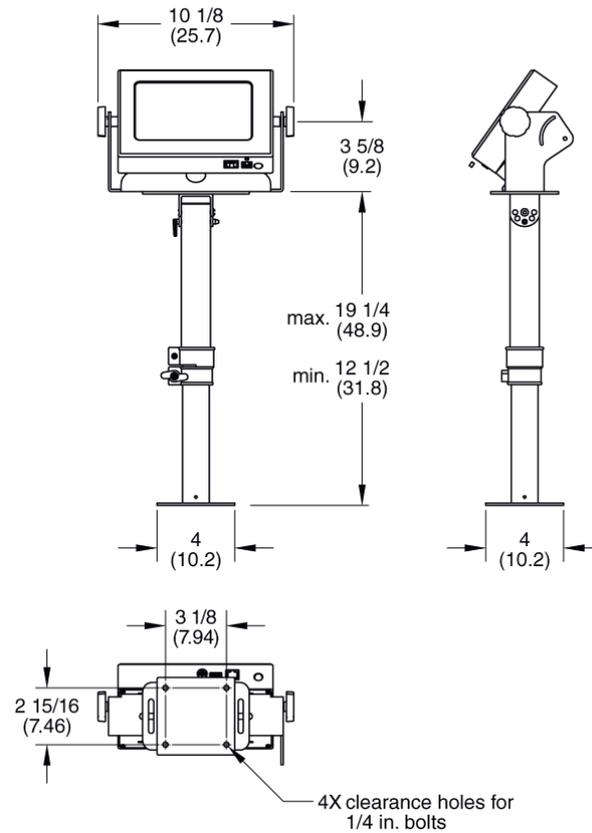
- 6.2.1. Large sign                      Approx. 265 lbs. (120kg) with integral tilt-frame
- 6.2.2. Small sign                      Approx. 220 lbs. (100kg) with integral tilt-frame

## 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

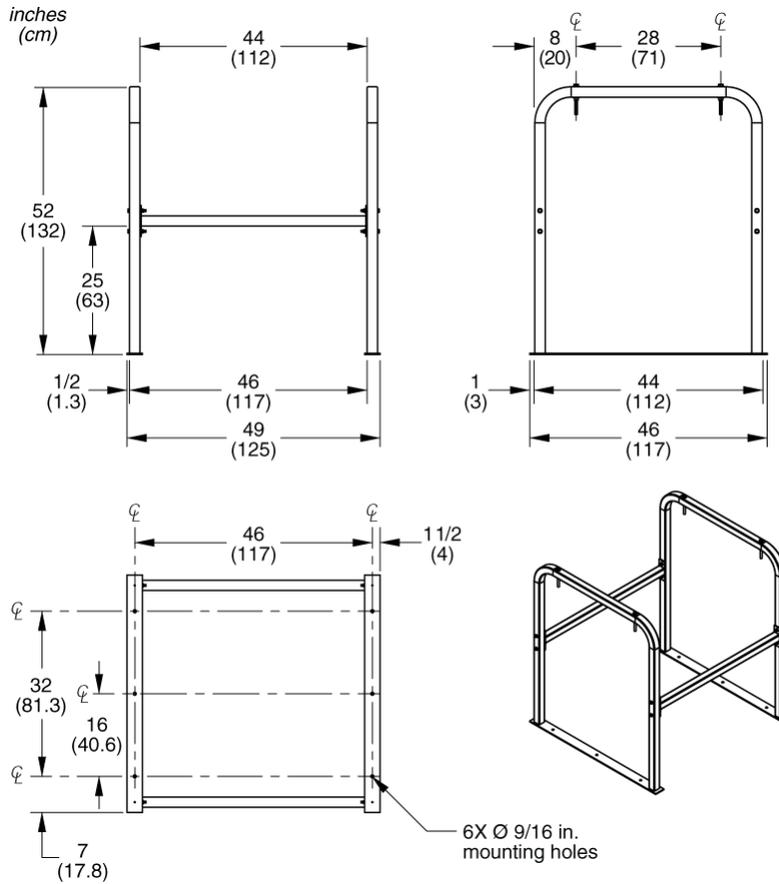
7.1.2. Dimensions *inches (cm)*



**7.2. Tall mounting frame**

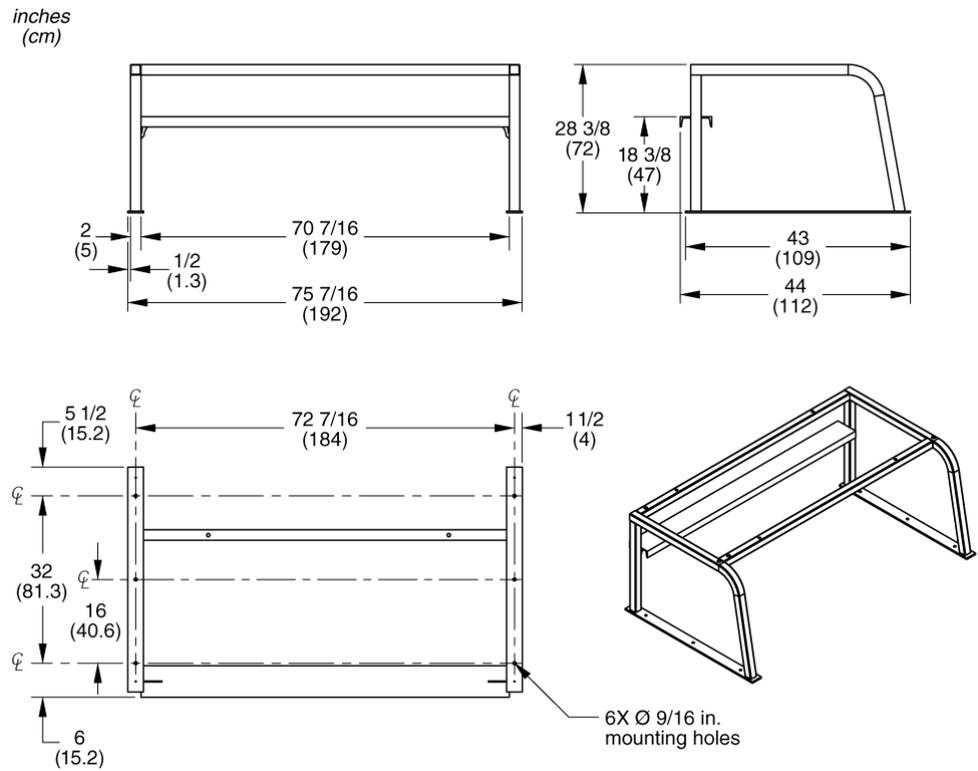
- 7.2.1. Description For use with pickup trucks, mounting frame raises message sign off truck bed.
- 7.2.2. Material Structural steel frame with flat bar steel base for mounting
- 7.2.3. Construction All welded tubing; sides and crossbars bolted together for final assembly
- 7.2.4. Finish Frame is coated 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



**7.3. Low mounting frame**

- 7.3.1. Description            Mounting frame raises message sign off service truck bed and includes C-channel for installing user-supplied light bar.
- 7.3.2. Material                Structural steel frame with flat bar steel base for mounting
- 7.3.3. Construction         All welded
- 7.3.4. 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.
- 7.3.5. Dimensions           *inches*  
*(cm)*



## EXHIBIT A: MESSAGE FONTS

### Large sign



#### Font 1

5 x 9 pixels

Equivalent size: 6.80" x 12.15" (173 x 309mm)

Physical size: 6.10" x 11.46" (155 x 291mm)

Standard fixed-width font with lower-case letters

3 lines of 8 characters, maximum



#### Font 2

5 x 9 pixels

Equivalent size: 6.80" x 12.15" (173 x 309mm)

Physical size: 6.10" x 11.46" (155 x 291mm)

Standard fixed-width font with lower-case letters and increased horizontal spacing

3 lines of 6 characters, maximum



#### Font 3

6 x 9 pixels

Equivalent size: 8.14" x 12.15" (207 x 309mm)

Physical size: 7.44" x 11.46" (189 x 291mm)

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

3 lines of 7 characters, typical



#### Font 4

6 x 11 pixels

Equivalent size: 8.14" x 14.83" (207 x 377mm)

Physical size: 7.44" x 14.14" (189 x 359mm)

Bold proportional font with lower-case letters and accented characters

2 lines of 6 characters, typical



#### Font 5

6 x 11 pixels

Equivalent size: 8.14" x 14.83" (207 x 377mm)

Physical size: 7.44" x 14.14" (189 x 359mm)

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

2 lines of 6 characters, typical



#### Font 6

5 x 14 pixels

Equivalent size: 6.80" x 18.85" (173 x 479mm)

Physical size: 6.10" x 18.15" (155 x 461mm)

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

2 lines of 8 characters, maximum

Large sign (continued)



**Font 7**

7 x 12 pixels

Equivalent size: 9.48" x 16.17" (241 x 411mm)

Physical size: 8.78" x 15.47" (223 x 393mm)

Bold fixed-width font with 6x8-pixel capitals for lower-case letters  
2 lines of 6 characters, maximum



**Font 8**

7 x 23 pixels

Equivalent size: 9.48" x 30.89" (241 x 785mm)

Physical size: 8.78" x 30.20" (223 x 767mm)

Large fixed-width font with 6x14-pixel capitals for lower-case letters  
1 line of 6 characters, maximum



**Font 9**

11 x 23 pixels

Equivalent size: 14.83" x 30.89" (377 x 785mm)

Physical size: 14.14" x 30.20" (359 x 767mm)

Large bold fixed-width font, capitals only (no lower-case letters)  
1 line of 4 characters, maximum



**Font 10**

4 x 5 pixels

Equivalent size: 5.46" x 6.80" (139 x 173mm)

Physical size: 4.77" x 6.10" (121 x 155mm)

Mini proportional font with limited lower-case  
4 lines of 9 characters, typical  
10 characters per line, maximum



**Font 11**

7 x 10 pixels

Equivalent size: 9.48" x 13.49" (241 x 343mm)

Physical size: 8.78" x 12.80" (223 x 325mm)

Large fixed-width font, capitals only (no lower-case letters)  
2 lines of 5 characters, maximum



**Font 12**

9 x 14 pixels

Equivalent size: 12.15" x 18.85" (309 x 479mm)

Physical size: 11.46" x 18.15" (291 x 461mm)

Large bold fixed-width font, capitals only (no lower-case letters)  
2 lines of 3 characters, maximum

### Small sign



#### Font 1

5 x 9 pixels

Equivalent size: 6.80" x 12.15" (173 x 309mm)

Physical size: 6.10" x 11.46" (155 x 291mm)

Standard fixed-width font with lower-case letters

2 lines of 8 characters, maximum



#### Font 2

5 x 9 pixels

Equivalent size: 6.80" x 12.15" (173 x 309mm)

Physical size: 6.10" x 11.46" (155 x 291mm)

Standard fixed-width font with lower-case letters and increased horizontal spacing

2 lines of 6 characters, maximum



#### Font 3

6 x 9 pixels

Equivalent size: 8.14" x 12.15" (207 x 309mm)

Physical size: 7.44" x 11.46" (189 x 291mm)

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

2 lines of 7 characters, typical



#### Font 4

6 x 11 pixels

Equivalent size: 8.14" x 14.83" (207 x 377mm)

Physical size: 7.44" x 14.14" (189 x 359mm)

Bold proportional font with lower-case letters and accented characters

1 line of 6 characters, typical



#### Font 5

6 x 11 pixels

Equivalent size: 8.14" x 14.83" (207 x 377mm)

Physical size: 7.44" x 14.14" (189 x 359mm)

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

1 line of 6 characters, typical



#### Font 6

5 x 14 pixels

Equivalent size: 6.80" x 18.85" (173 x 479mm)

Physical size: 6.10" x 18.15" (155 x 461mm)

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

1 line of 8 characters, maximum



Small sign (continued)



**Font 7**

7 x 12 pixels

Equivalent size: 9.48" x 16.17" (241 x 411mm)

Physical size: 8.78" x 15.47" (223 x 393mm)

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

1 line of 6 characters, maximum



**Font 8**

7 x 23 pixels

Does not fit on sign

**Font 9**

11 x 23 pixels

Does not fit on sign



**Font 10**

4 x 5 pixels

Equivalent size: 5.46" x 6.80" (139 x 173mm)

Physical size: 4.77" x 6.10" (121 x 155mm)

Mini proportional font with limited lower-case

3 lines of 9 characters, typical



**Font 11**

7 x 10 pixels

Equivalent size: 9.48" x 13.49" (241 x 343mm)

Physical size: 8.78" x 12.80" (223 x 325mm)

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

1 line of 5 characters, maximum



**Font 12**

9 x 14 pixels

Equivalent size: 12.15" x 18.85" (309 x 479mm)

Physical size: 11.46" x 18.15" (291 x 461mm)

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

1 line of 3 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



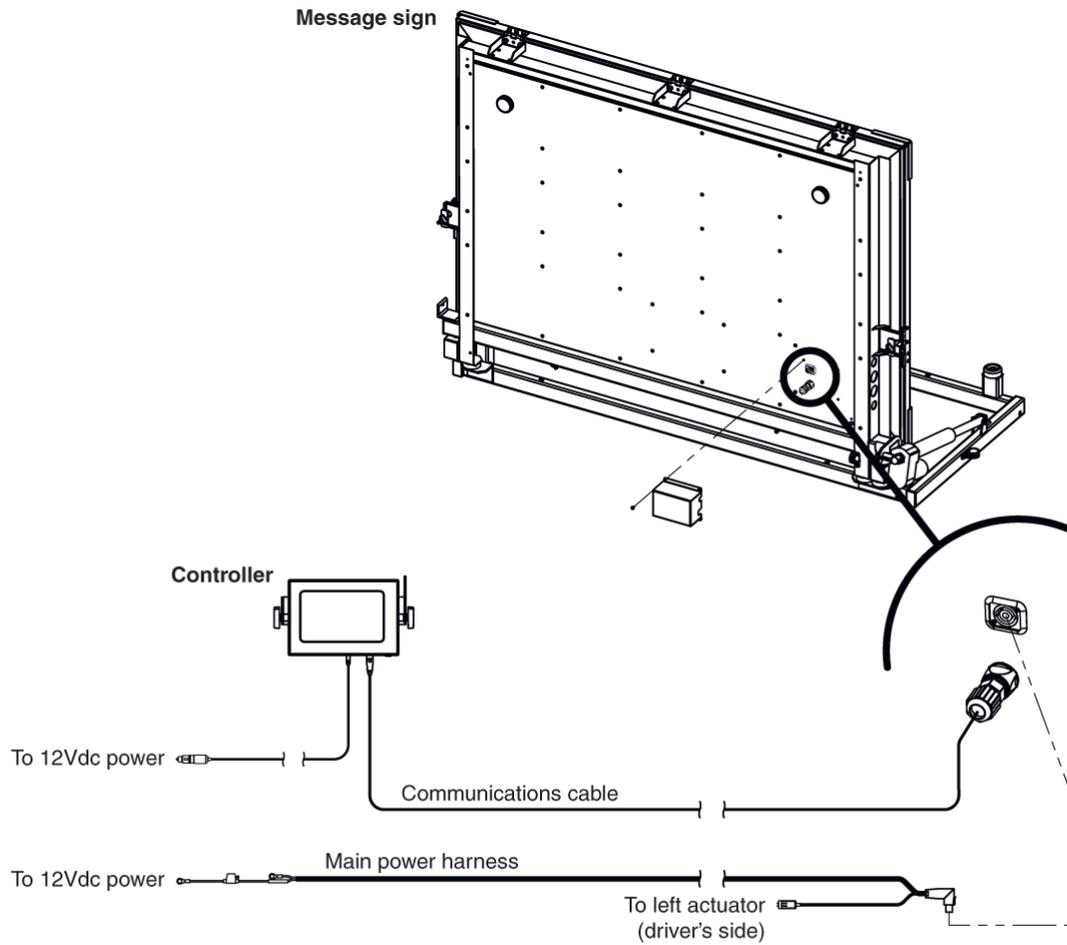
Sequencing left or right chevron arrows



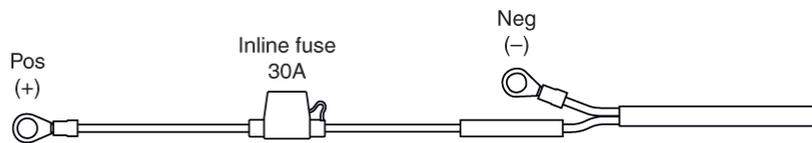
Alternating diamonds

### EXHIBIT C: SYSTEM WIRING OVERVIEW

#### Overview

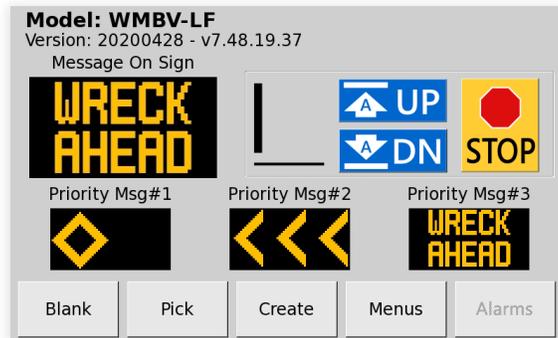


#### Detail view: Main power harness



### EXHIBIT D: USER-INTERFACE SAMPLE SCREENS

#### Main screen with “single click” functions, message display, and tilt control



#### Message “pick” screen—weather messages group

