Wanco® Arrow Boards

5-Pattern Truck-Mount Models

Owner's Manual

January 2025

WANCO® The industry leader.

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1 Introduction

1.1 Read before using

This is the owner's manual for Wanco® Truck-Mounted Arrow Boards with five display patterns, including factory mounting frames and standard controllers.

Arrow Boards with custom options may require additional information that is not provided in this document. Skid-mounted and connected arrow boards are covered in separate documents.

For your safety and protection from injury, carefully read, understand, and observe all instructions in this manual. Always read all instructions before performing a procedure.

Illustrations in this document represent all arrow board models, but might differ in detail from your arrow board.

Keep this manual with the arrow board. Additional and replacement manuals are available from the factory (see Section 1.6, "Where to obtain service," page 4).

If you have questions regarding this product, please contact Wanco Customer Service using the information in Section 1.6, page 4.

1.2 Arrow board models

All models of Wanco Truck-Mounted Arrow Boards that use 5-pattern controllers are covered by this manual. All models are operationally similar. Functional differences between models are:

- Arrow board size and shape
- Number of display lights
- Mounting frame style
- Power system

Available options are listed in Table 1-1.

Table 1-1. Options for truck-mounted arrow boards

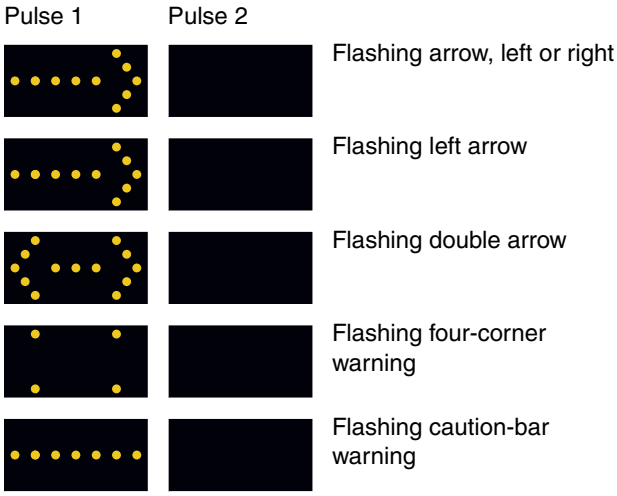
✓ *Check indicates available option*

Lights and display patterns	Arrow board size, H×W *(inches)*				Split arrows
	48×96	36×72	30×60	24×48	
15 lights, 5 patterns	✓	✓	✓		
14 lights, 5 patterns					✓
13 lights, 5 patterns				✓	
Power system					
Vehicle power	✓	✓	✓	✓	✓
Integrated battery/solar power	✓	✓	✓		
Mounting					
No mounting frame	✓	✓	✓	✓	✓
Manual (auto-lock) tilt-frame	✓	✓	✓	✓	✓
90° power-tilt frame	✓	✓	✓	✓	
90° low-profile power-tilt frame		✓	✓		✓
180° power-tilt frame		✓	✓		
Tailgate mounting kit	✓	✓	✓	✓	
Trailer mounting kit	✓				

1.3 Display patterns

Installed on a truck or trailer, arrows and caution patterns are selected using a controller that is typically installed inside the truck cab. Patterns are illustrated in Figure 1-1.

Figure 1-1. Flashing display patterns



1.4 Applications

Truck-mounted arrow boards are widely used for temporary work zones and convoys. They feature bright LED lights that are highly visible and legible from a great distance.

Installed on a truck or trailer, arrows and caution patterns displayed on the arrow board can be seen from up to a mile away. Display patterns are selected using a controller that is typically installed inside the truck cab. Patterns are illustrated in Figure 1-1, page 2.

Common applications include:

- Accident and incident management
- Emergency repairs
- Road-striping and street-sweeping convoys
- Crash-cushion (TMA) trucks and trailers

1.5 MUTCD requirements

The U.S. Department of Transportation's *Manual on Uniform Traffic Control Devices* (MUTCD), which defines the standards for traffic control devices on all public streets and private roads open to public traffic, specifies Type A, B, C, and D arrow boards and defines their minimum size, legibility distance, and number of lights.*

Table 1-2 lists the MUTCD Type for each Wanco Truck-Mounted Arrow Board.

Consult the MUTCD for distance and legibility requirements for your application. The MUTCD is available online at http://mutcd.fhwa.dot.gov.

Table 1-2. MUTCD arrow board types

Arrow board size or style	MUTCD Type
24×48	A
30×60	B
36×72	B
48×96	C
Split plastic arrows	D

**MUTCD, 11th ed., December 2023, §6L.06, ¶05*

1.6 Where to obtain service

Before calling for service, please have the arrow board identification (ID) number ready. The ID number can be found in these locations (see Figure 1-2):

- On the bottom of a rectangular arrow board near the power cable
- On the mounting frame for split arrows
- On the back of the arrow board controller

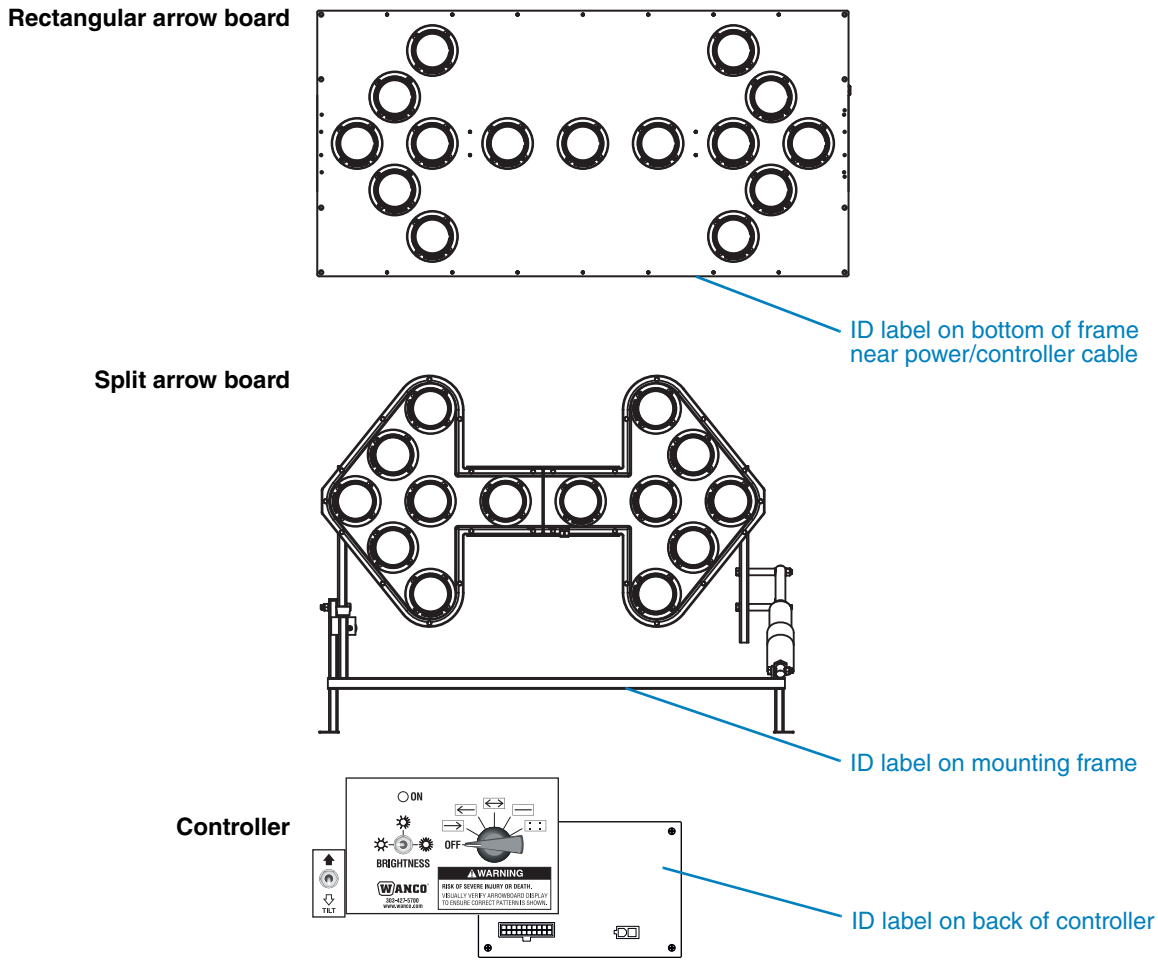
Contact our service department using the following information:

Wanco Inc.
5870 Tennyson Street
Arvada, Colorado 80003

303-427-5700
fax 303-427-5725

www.wanco.com
info@wanco.com

Figure 1-2. Identification number locations



2 Safety Information

2.1 Safety statements in this manual

This manual contains the following types of callouts, which must be followed to reduce the possibility of personal injury, damage to the equipment, or improper service. Each alert has a specific meaning, as described below:

⚠ The safety alert symbol alerts you to potential personal injury hazards. Obey all safety messages that follow this symbol to avoid possible injury or death.

⚠ DANGER

Indicates an imminently hazardous situation which, if not avoided, WILL result in death or serious injury.

⚠ WARNING

Indicates an imminently hazardous situation which, if not avoided, COULD result in death or serious injury.

⚠ CAUTION

Indicates a potentially hazardous situation which, if not avoided, could result in minor or moderate injury.

CAUTION

Used without the safety alert symbol, indicates a potentially hazardous situation which, if not avoided, could result in property damage.

IMPORTANT!

Indicates information that is of particular importance when transporting, operating, or servicing the equipment.

2.2 General safety

⚠ WARNING

Improper use of equipment could cause serious injury or death.

Prior to using this product, carefully read, understand, and observe all instructions in this manual.

⚠ CAUTION

Crush hazard.

When operating or working on the arrow board, keep hands and body parts clear of pinch points.

CAUTION

Welding on the vehicle can cause electrical damage to the arrow board and its controller.

Always disconnect arrow board and controller from power source before welding on vehicle.

2.3 Operating safety

Before using the arrow board, ensure the arrow board and its mounting system are in good operating condition. Never use any equipment that is damaged or in need of repair.

⚠ WARNING

Improper display could cause a traffic accident resulting in severe injury or death.

Visually inspect arrow board to ensure correct pattern is displayed.

- Always visually inspect the arrow board display to ensure it is operating as expected.
- Always fix or replace lights that are not functioning properly.

2.4 Service safety

⚠ WARNING

Moving parts can crush and cut.

Keep hands, feet, hair, and loose clothing away from moving parts.

⚠ CAUTION

Shock hazard.

Contact with live electrical circuits could damage equipment or cause injury.

- Disconnect arrow board from power before servicing any component on the arrow board.
- Only a qualified electrician should service the electrical system.

⚠ CAUTION

Adverse weather conditions can cause equipment damage and injury.

Whenever possible, perform maintenance indoors.

- To prevent injury, keep hands, feet, hair, and loose clothing away from all moving parts.
- Never perform any service unless all electrical components are shut down.
- If the arrow board, the vehicle, or the ground under or around the vehicle is damp or wet, allow it to dry before servicing.
- Do not service the arrow board if clothing or skin is wet.
- Always take precautions to ensure the safety of service personnel. Whenever possible, perform maintenance indoors, out of the weather, and away from traffic.
- For reliable arrow board performance, keep the arrow board and all its components clean.
- Always be aware of traffic when performing roadside maintenance.

3 Assembly

3.1 Read before assembling

- If the arrow board was ordered without a mounting kit, no assembly is required prior to installation. Proceed to Section 4, page 17, for installation instructions.
- If the arrow board has a mounting kit:
  - ☐ The mounting frame included with your arrow board might not fit your vehicle. Additional brackets or modifications may be necessary.
  - ☐ For assembly instructions for your arrow board mounting frame, see Table 3-1.
- For sizes, dimensions, and weights, see Appendix A, page 39.

Table 3-1. Assembly instructions

Mounting option	Arrow board base model no.	Assembly instructions
90-degree manual-tilt (auto-lock) frame	WFB WFBLA-14	Section 3.2, page 10
90-degree power-tilt frame	WFBP	Section 3.3, page 12
90-degree low-profile power-tilt frame	WLP90B WFBLA-14L	Section 3.4, page 13
180-degree power-tilt frame	WFP180B	Section 3.5, page 13
Tailgate kit	WVGB	Section 3.6, page 14
Truck-bed kit	—	Section 3.7, page 15
Trailer-mount kit	—	Section 3.8, page 16

3.2 Auto-lock frame

The auto-lock frame is a manually operated tilt-frame that allows the arrow board to tilt from horizontal to vertical. It has a spring-loaded pin that automatically engages to lock the frame in position at 90-degree intervals. The auto-lock frame does not have an electrically powered tilt mechanism.

To assemble the auto-lock frame, refer to Figure 3-1, or Figure 3-2 for split arrows, and follow these steps:

1. Ensure the arrow board is oriented with the power/controller cable pigtail coming out the bottom.
2. Identify the left upright, which includes the auto-lock mechanism.
3. Attach the left upright to the arrow board using two bolts, four washers, and two nuts.
4. Attach the right upright to the arrow board using two bolts, four washers, and two nuts.
5. Attach both uprights to the crossbar using four bolts, eight washers, and four nuts.

   Note that the location of these bolts can also be used for attaching the entire assembly to the vehicle, or to the optional Wanco truck-bed mounting brackets. Longer, user-supplied bolts would go down through the uprights, cross bar, and supporting framework on the vehicle or truck-bed brackets, attaching them together.

   If your installation will use this approach, either attach the uprights to the crossbar first, leaving them hand-tight, and complete the installation later when installing the assembly on the vehicle; or proceed to Section 3.7, page 15, to complete the assembly with the truck-bed brackets.

   Regardless of the installation, the uprights must be attached to the crossbar.
6. Ensure all connections are tight.
7. Test the tilt and auto-lock mechanism (see Section 5.3.2, page 28).

Figure 3-1. Assembling the auto-lock frame with an arrow board

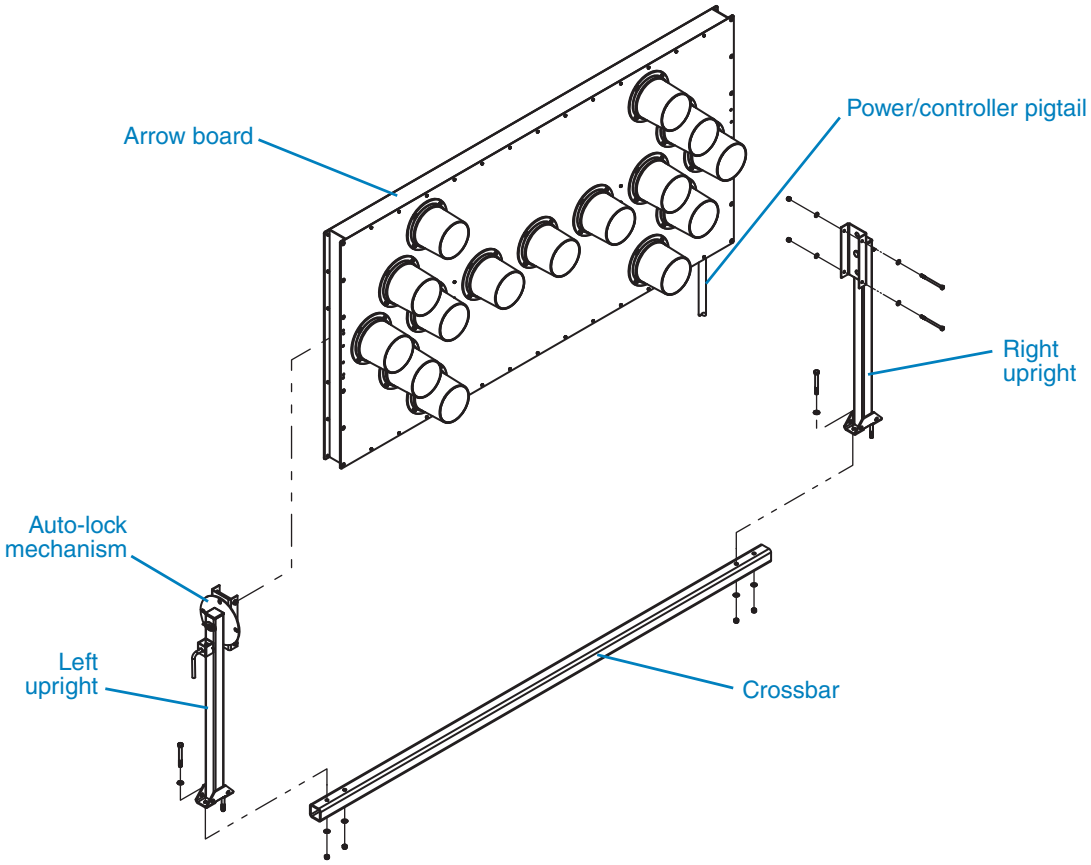
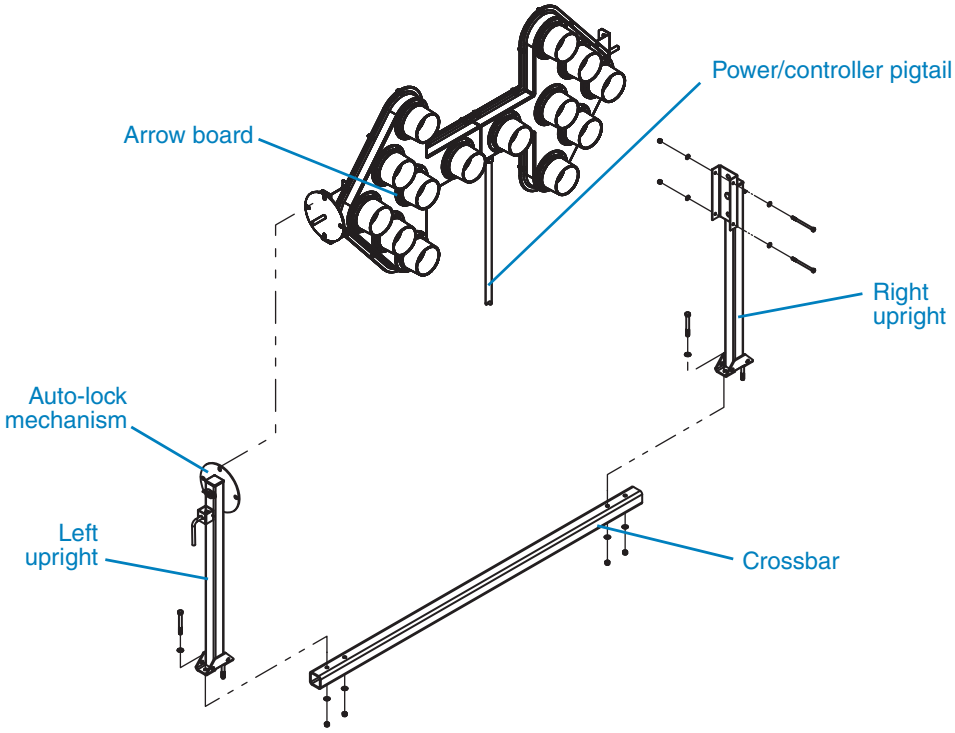


Figure 3-2. Assembling the auto-lock frame with split arrows



3.3 90-degree power-tilt frame

The 90-degree power-tilt frame has an electric actuator that allows the operator to tilt the arrow board from horizontal to vertical and back again. The operator controls the actuator using the arrow board controller, which is usually located inside the vehicle.

If the arrow board and power-tilt frame were received from the factory already assembled, no further assembly is required prior to installation. Proceed to Section 4, page 17, for installation instructions.

To assemble the power-tilt frame, refer to Figure 3-3 and follow these steps:

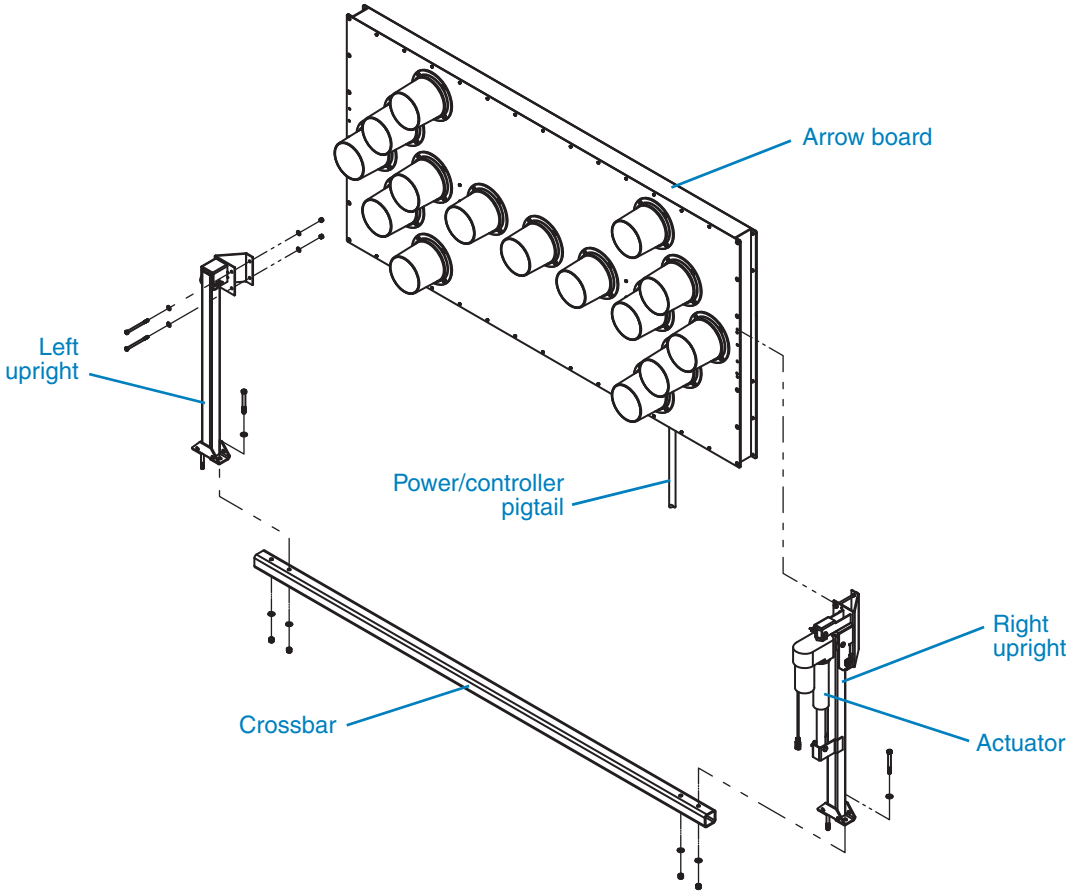
1. Ensure the arrow board is oriented with the power/controller cable pigtail coming out the bottom.
2. Identify the right upright, which includes the actuator.
3. Attach the right upright to the arrow board using two bolts, four washers, and two nuts.
4. Attach the left upright to the arrow board using two bolts, four washers, and two nuts.
5. Attach both uprights to the crossbar using four bolts, eight washers, and four nuts.

   Note that the location of these bolts can also be used for attaching the entire assembly to the vehicle if desired, or to the optional Wanco truck-bed mounting brackets. Longer, user-supplied bolts would go down through the uprights, cross bar, and supporting framework on the vehicle, or the truck-bed brackets, attaching them together.

   If your installation will use this approach, either attach the uprights to the crossbar now, leaving them hand-tight, and complete the installation later when installing the assembly on the vehicle; or proceed to Section 3.7, page 15, to complete the assembly with the truck-bed brackets.

   Regardless of the installation, the uprights must be attached to the crossbar.
6. Ensure all connections are tight.
7. After installing the arrow board on the truck (see Section 4, page 17), use the controller to test the electric actuator and tilt frame for proper operation (see Section 5.2, page 27).

Figure 3-3. Assembling the 90-degree power-tilt frame



3.4 Low-profile 90-degree power-tilt frame

The low-profile 90-degree tilt frame is installed onto the arrow board at the factory and does not require assembly.

After installing the arrow board on the truck (see Section 4, page 17), use the controller to test the electric actuator and tilt frame for proper operation (see Section 5.2, page 27).

3.5 180-degree power-tilt frame

The 180-degree tilt frame is installed onto the arrow board at the factory and does not require assembly.

After installing the arrow board on the truck (see Section 4, page 17), use the controller to test the electric actuator and tilt frame for proper operation (see Section 5.2, page 27).

3.6 Tailgate kit

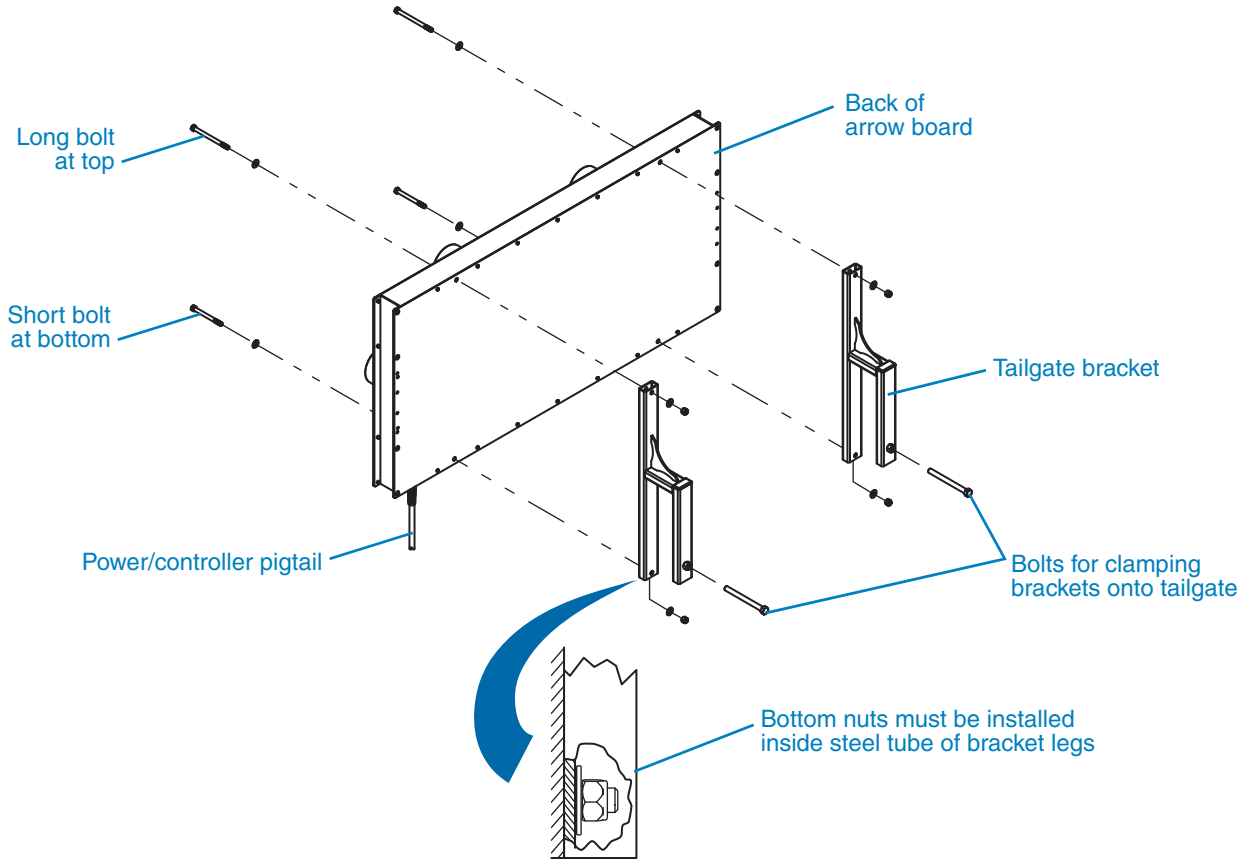
The tailgate kit allows the arrow board to be installed in a fixed position on a truck tailgate. Two brackets are attached to the arrow board and then clamp to the tailgate for permanent or temporary installation.

To assemble the tailgate kit, refer to Figure 3-4 and follow these steps:

1. Ensure the arrow board is oriented with the power/controller cable pigtail coming out the bottom.
2. Two mounting holes near the top of the arrow board and two near the bottom are used for attaching the tailgate brackets to the arrow board. Locate these four holes.
3. Attach either bracket to the arrow board using two bolts, four washers, and two nuts. Use the longer bolt at the top of the arrow board, the shorter bolt at the bottom. The washer and nut at the bottom of the bracket must go inside the bracket leg.
4. Repeat Step 3 for the remaining bracket.
5. Ensure all connections are tight.

When installing the arrow board with tailgate brackets onto the truck (Section 4, page 17), ensure the brackets are well seated, all the way down on the tailgate, and the bolts for clamping the brackets to the tailgate are tightened and secure.

Figure 3-4. Assembling the tailgate kit



3.7 Truck-bed kit

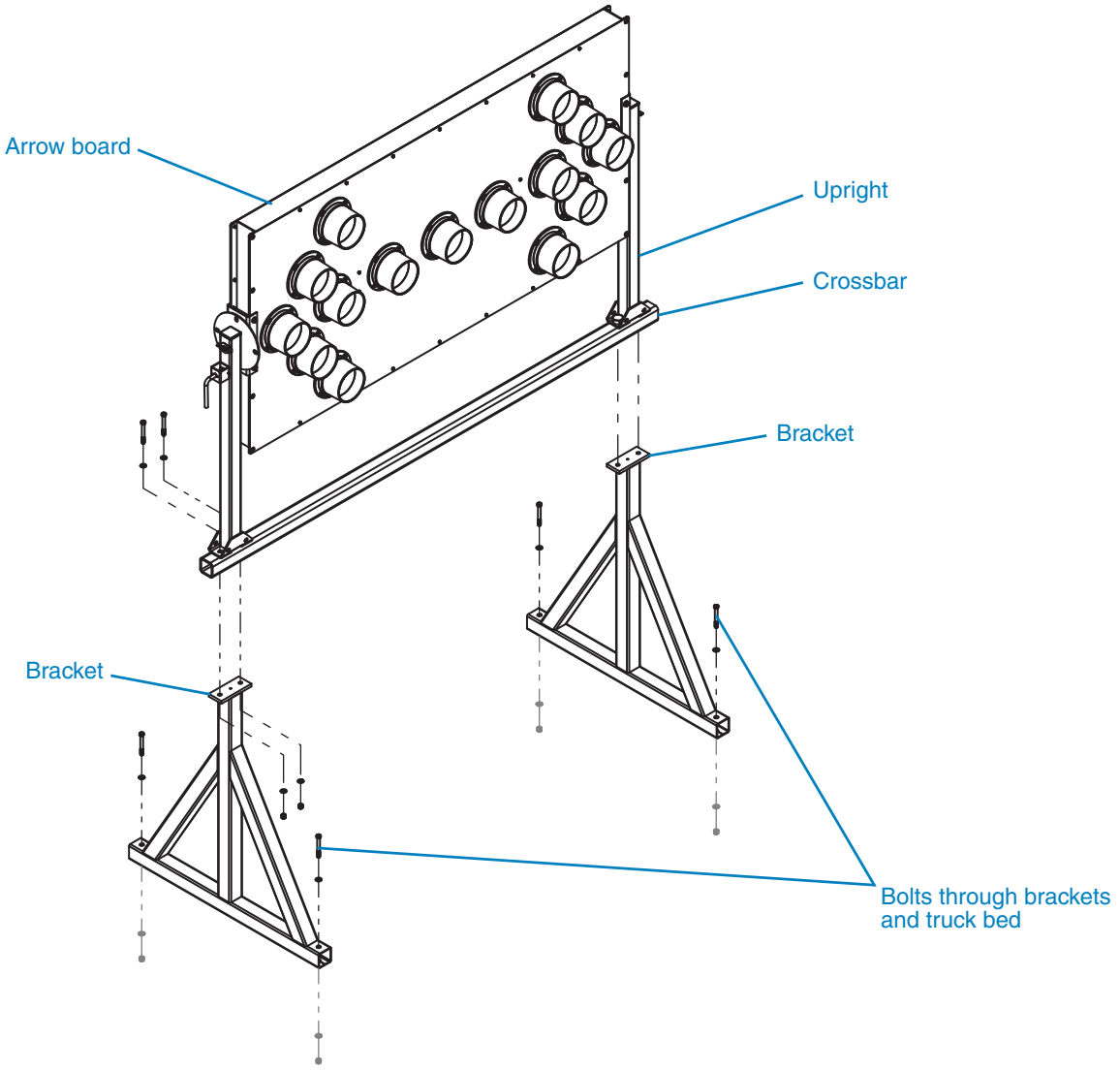
The truck-bed kit allows the arrow board to be installed on a truck bed. Two brackets are bolted to the bed and support either the 90-degree manual-tilt or 90-degree power-tilt frame. Hardware for attaching the brackets to the truck are user-supplied.

To assemble the truck-bed brackets onto the tilt-frame crossbar, use four bolts, eight washers, and four nuts (see Figure 3-5). All bolts should go down through the tilt-frame uprights, crossbar, and truck-bed brackets. Ensure all connections are tight.

When installing the arrow board onto the truck with truck-bed brackets (Section 4, page 17), ensure the brackets are flat and secure on the truck bed. Ensure all connections are tight.

After installation on the truck, test the auto-lock mechanism (see Section 5.3.2, page 28) or use the controller to test the electric actuator and tilt frame (Section 5.2, page 27) for proper operation.

Figure 3-5. Assembling the truck-bed kit



3.8 Trailer-mount kit

The trailer-mount kit allows the arrow board to be installed on a trailer, but is specifically designed for easy installation on a Traffix Devices Scorpion® attenuator trailer.

On the Scorpion trailer, two uprights slide into brackets on the front end of the trailer frame and are bolted in place. On other trailers, custom brackets must be user-supplied.

The trailer-mount arrow board and tilt frame are assembled at the factory. For trailer mounting, refer to Figure 3-6 and choose whether to:

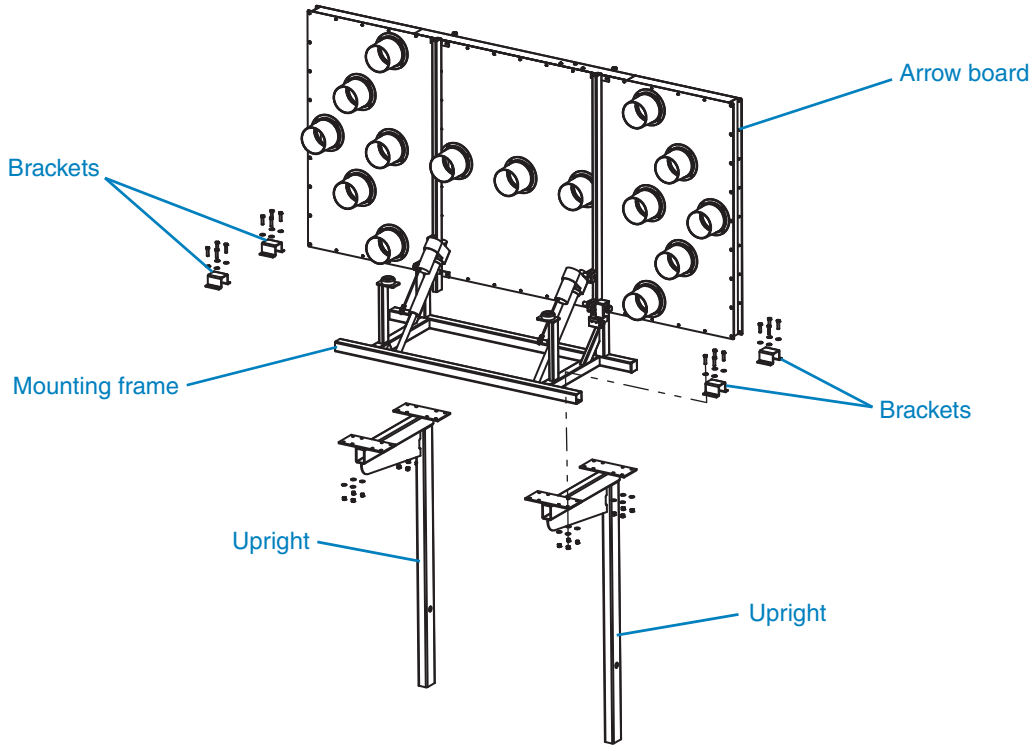
- Attach the two uprights to the arrow board mounting frame and then install the entire assembly on the trailer.
- Attach the uprights to the trailer and then attach the arrow board mounting frame to the uprights.

  Before installing the uprights, orient the arrow board so that it will face traffic (lights toward the rear of the trailer) when it is tilted up to the vertical position.

  Use all four brackets and either set of holes on the uprights to clamp the mounting frame down onto the uprights. Use four bolts, eight washers, and four nuts for each bracket. Ensure all connections are tight.

  After installation (Section 4, page 17), use the controller to test the actuators and tilt for proper operation (see Section 5.2, page 27).

Figure 3-6. Assembling the trailer-mount kit



4 Installation

Step 1: Installing the arrow board

The Wanco Truck Mounted Arrow Board is designed for installation on a truck or other large vehicle. It may be mounted on the truck bed or over the cab. The arrow board may also be installed on a trailer, such as a crash-cushion (TMA) trailer.

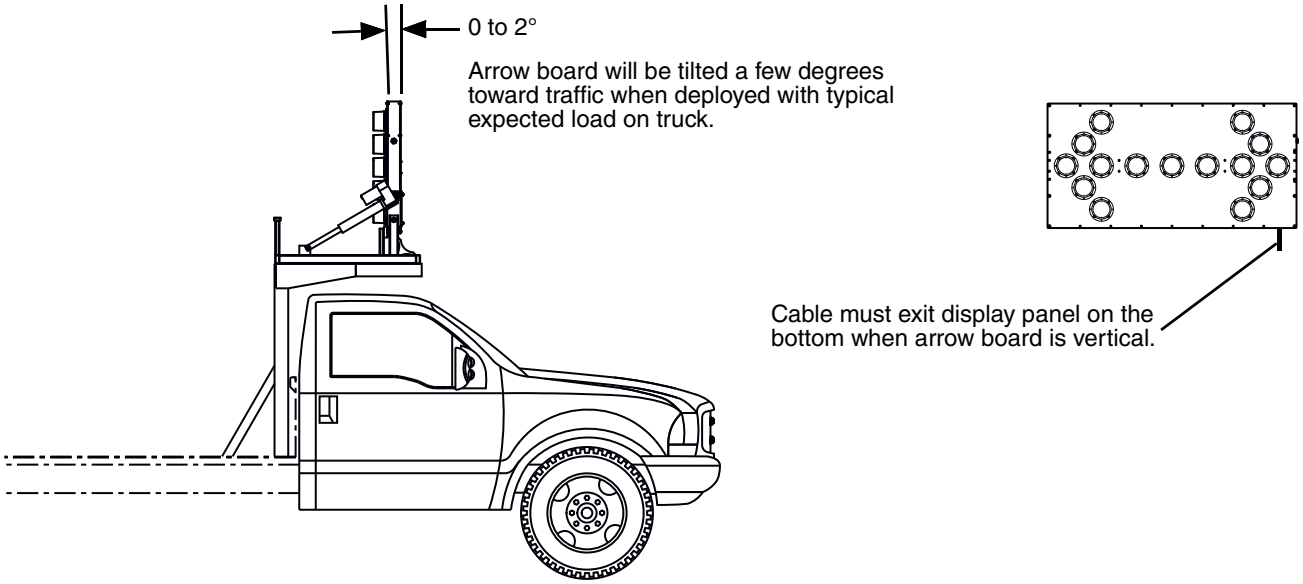
IMPORTANT!

Because there are many manufacturers and different types of vehicles, Wanco strongly recommends using a reputable truck upfitter to install the arrow board. Wanco provides only the arrow board assembly and wiring harness. The support structure and power connections are left up to the customer.

Use an experienced installer. Follow all guidelines and instructions provided by the vehicle manufacturer Body Builder Books.

- The arrow board might include an integrated or separate mounting frame. Several types of mounting frames are available from the factory. The mounting frame included with your arrow board might require modifications or additional brackets to fit your vehicle. Because installations vary, the factory does not include nuts and bolts for attaching the arrow board to the truck or trailer. Dimensions for standard Wanco mounting options are provided in Appendix A, page 39.
- Trailer-mounted arrow boards require a power source, such as batteries, an engine, or a generator. Your arrow board might include an optional, integral power system that includes batteries, a battery box, and a solar panel.
- Install the arrow board, mounting frame, and (if included) optional battery box using at least four sets of bolts, nuts, and washers. Orient the arrow board as illustrated in Figure 4-1, page 18.
- Use shims to ensure that, in the upright position with no load in the truck, the arrow board is vertical. With a typical load on the truck, the arrow board will angle downward about two degrees toward traffic (see Figure 4-1, page 18).
- If your arrow board includes a power-tilt frame, it might be necessary to tilt the arrow board up slightly from the horizontal position to complete the installation. In this case, begin by partially installing the arrow board and mounting frame, then make all wiring and power connections, and finish by completing the arrow board installation.

Figure 4-1. Arrow board installation



Step 2: Installing the controller

The arrow board controller is not weather resistant, and must be installed inside the truck cab or inside a weatherproof enclosure.

When choosing where to install the controller, select a location that will allow easy access and will not interfere with truck controls. Common mounting locations are on or under the dashboard.

⚠ WARNING

Poor controller location might result in a traffic accident that could cause serious injury or death.

Locate the controller where it can be operated safely under all driving conditions.

⚠ WARNING

Interfering with air bags could result in serious injury or death.

Do not install the controller where it may interfere with deployment of the vehicle's air bags or any other safety equipment. Refer to the vehicle owner's manual to determine the vehicle's air bag deployment zones.

⚠ CAUTION

Drilling holes through vehicle panels could result in equipment damage or personal injury.

When drilling holes for controller mounting bracket, use care to avoid damaging vehicle wiring and other sensitive equipment.

- To avoid potential interference from other devices, depending on the radio frequencies being used, install the controller as far as possible from other RF-emitting devices.
- Before choosing a location for the controller, take into account that cables must be routed between the arrow board and controller, and from the controller to a power source. For power system requirements, see page 20.
- The arrow board controller includes a mounting bracket. Because installations vary, the factory does not include hardware for attaching the bracket to the vehicle.
- If the controller does not include a power-tilt switch, its mounting bracket can be removed and reoriented for mounting the controller either on or under the dashboard. If the controller has a power-tilt switch mounted to the side, the mounting bracket can only be used for under-dashboard mounting.

Step 3: Installing the optional battery box and solar panel

If the arrow board system includes an optional battery box and solar panel, you may need to install them on the vehicle.

- Choose a location such that cables can reach the battery box, solar panel, and arrow board.
- Use P-clamps where necessary to keep cables from hanging loose, wearing, and being pinched. Never use wire ties to secure or hold cables in place. Do not let the cables hang loose.
- If the solar panel is attached to an arrow board on a tilting frame, leave slack in the panel's cable.

  The battery box and the solar panel may already be installed on the arrow board, depending on the design and configuration.

Step 4: Installing wiring

Wiring connections must be made between the arrow board, the controller, and a 12-volt DC power supply (typically the vehicle power system).

All cables and components are included with the arrow board but may be packaged separately when shipped from the factory.

To route cables and make wiring connections, follow the instructions below.

IMPORTANT!

Your Wanco arrow board requires power from a 12-volt DC negative-ground system. If your vehicle has an electrical system other than 12VDC, contact the factory before proceeding.

Wanco does not provide wiring schematics for vehicle-mounted arrow boards. Because installations vary, you must follow the vehicle manufacturer's requirements for installing auxiliary equipment. Consult your vehicle owner's Body Builder Books or contact the manufacturer for wiring instructions.

Use an experienced installer. Follow all guidelines and instructions provided by the vehicle manufacturer's Body Builder Books.

1. Determine how the arrow board will be powered:
   - The arrow board may be wired to operate while the vehicle is running or when it is not. The preferred method is to have the vehicle running while the arrow board is operating.
   - Some installations include an optional automated solar-based charging system that is independent of the vehicle's power. Others may include an auxiliary battery or a portable generator.
   - The system's maximum power load is 2 amps (or 30 amps with an electric actuator) at 13.6 volts DC.
   - Most vehicle manufacturers provide instructions for installing auxiliary equipment. Consult your vehicle's Body Builder Book for wiring instructions.
   - In all cases, the battery must have an active charging system; otherwise, the arrow board will eventually drain the battery voltage and automatically shut down.
2. Make cable connections at the arrow board:
   a. Attach the power/controller extension cable to the pigtail coming out of the bottom of the arrow board.
   b. If the arrow board has a power-tilt frame, locate the pigtail coming out of the electric actuator, and plug it into the actuator extension cable.

3. Before routing cables, observe safety requirements to ensure proper operation of all equipment, the arrow board, and the vehicle.

⚠ WARNING

Interfering with the vehicle's safety restraints could result in serious injury or death.

When routing electrical wiring through the vehicle, ensure that cables and wires do not interfere with passenger safety restraints such as seat belts and air bags. Refer to the vehicle's Body Builder Book to determine the vehicle's air bag deployment zones.

⚠ CAUTION

Improper wiring can result in equipment failure and serious injury.

- When drilling holes, use care to avoid damaging vehicle wiring and other sensitive equipment.
- Where wires and cables penetrate vehicle panels, use appropriate grommets to protect wiring from sharp edges.
- Ensure wires and cables do not interfere with vehicle operation.
- Keep wires and cables clear of gas, clutch, and brake pedals.
- Keep wires and cables clear of pinch points and heat sources such as exhaust pipes.
- Do not force wiring connectors together. Ensure connectors are properly aligned, then gently press together. Do not remove, bend, or damage wire connector pins.
- Add cable and wire service loops wherever needed to support proper movement and operation of the arrow board.

4. Route cables from the arrow board, but DO NOT connect any cables yet:
   - Do not cut any cables or rewire connectors to make the cables shorter. Instead, determine where the extra lengths of cable can be stowed safely after connections are made. After routing cables, coil—do not bundle—the extra lengths using nylon wire ties.
   - Do not bundle cables. Bundling can damage cables and cause equipment failure.
   - Installed cables should be protected by a weather-resistant loom. Use P-clamps where necessary to keep cables from hanging loose, wearing, and being pinched. Never use wire ties to secure or hold cables in place.

5. Refer to Figure 4-2 and follow these instructions:

    a. Route the power/communications and actuator extension cables from the arrow board into the truck cab and to the controller, then plug the connectors into the back of the controller.

    b. Because the controller does not have an on/off switch, ensure the power cable from the controller will include a circuit-disconnect for disengaging power easily; for example, a relay connected to the vehicle ignition switch. If wiring a fuse into the circuit, the fuse should be at the battery. For an arrow board with a power-tilt frame, use a 30-amp fuse; otherwise, use a 5-amp fuse.

    c. Plug the 2-pin power cable connector into the back of the controller, then route the power cable to the power supply. DO NOT connect the cable to power yet.

    d. Check all wiring connections and fasteners, ensuring no wiring will come loose during operation.

    e. Connect the power cable (from the controller) to the power supply according to the vehicle manufacturer's instructions.

Step 5: Completing the installation

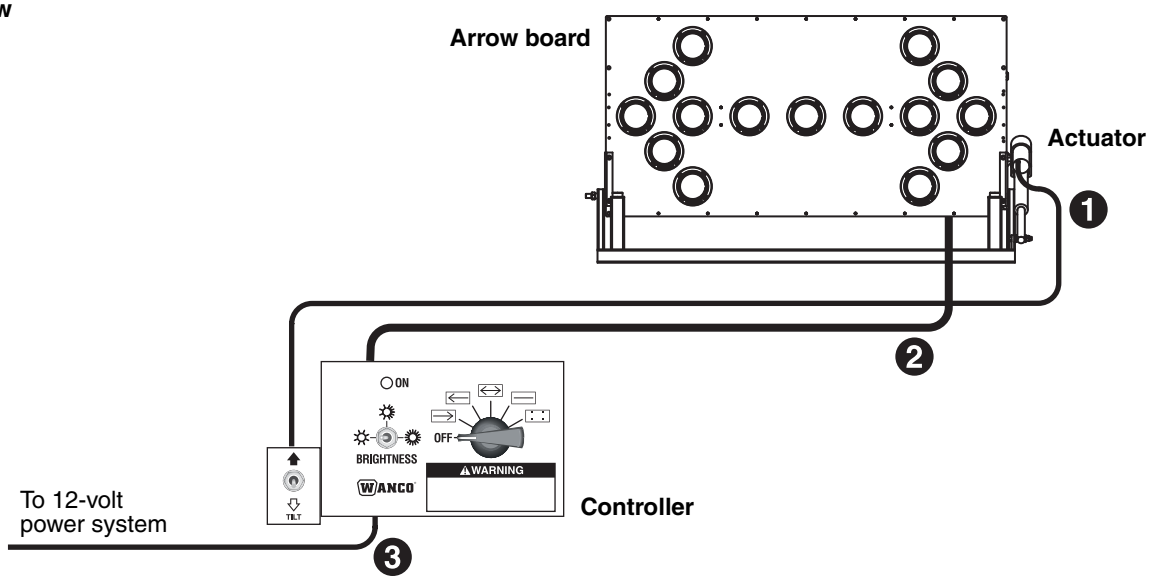
The arrow board is now operational. If necessary, use the controller to raise the arrow board part way, then install the remaining sets of bolts, nuts, and washers in the mounting frame.

The arrow board controller is always on when powered, regardless of whether the arrow board is showing a pattern (an arrow or caution pattern).

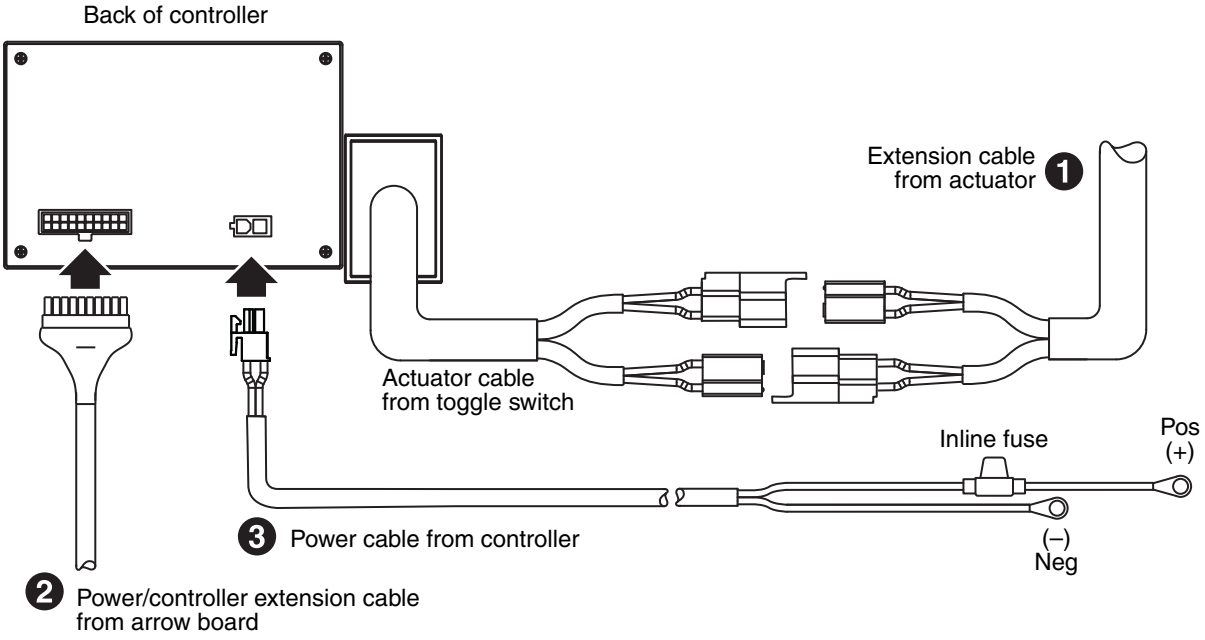
For operating instructions, see Section 5, page 25.

Figure 4-2. System wiring

Overview



Detail



5 Operation

5.1 Before you begin

5.1.1 Safety

⚠ WARNING

Improper display could cause a traffic accident resulting in severe injury or death.

- Visually inspect arrow board to ensure correct pattern is displayed.
- Verify arrow board is fully upright and visible to traffic while in use.

⚠ WARNING

Contact with overhead obstructions could result in equipment damage, severe injury, or death.

Avoid driving under low-hanging obstructions while the arrow board is onboard the vehicle.

IMPORTANT!

It is important to understand when the arrow board and controller are drawing power from the power system. Before operating the arrow board, refer to Section 5.1.2, page 26.

- Before operating the arrow board, read and follow all safety instructions in Section 2, page 5.
- Adhere to all local regulatory codes when using the arrow board.
- Safe use of the arrow board is the responsibility of the operator.
- The arrow board may add height to the vehicle, even when in the travel (horizontal) position. Contact with overhead obstructions such as signs, bridges, wires, garage doors, and tree limbs could damage the arrow board and the vehicle, and could cause injury or death if people or traffic are nearby.
- For safe vehicle speed, consider the following:
  - ☐ Wanco Truck-Mount Arrow Boards are designed for use at typical highway speeds when properly installed and operated. Many factors contribute to safe operation of the vehicle while the arrow board is deployed (in the vertical position), regardless of vehicle speed—including vehicle size and weight, size of the board, the relative

sizes of the board and vehicle, height of the board, and quality of the installation. Maximum safe vehicle speed with the arrow board deployed should be at the recommendation of the vehicle upfitter or arrow board installer.

- ☐ Deploying the arrow board (i.e., changing its position from horizontal to vertical) while the vehicle is moving will increase stress on the power-tilt actuator and mounting system due to increased wind resistance. Likewise, in the deployed (vertical) position, wind resistance increases as the vehicle speeds up, increasing stress on the mounting system and support structure.
- ☐ Use care when deploying the arrow board while the vehicle is moving, and when traveling at high speeds while the arrow board is deployed. Before operating the vehicle, always check the condition of the arrow board and its mounting frame, support structure, power-tilt actuators, and wiring for potential failures. Ensure pivot points are in good condition, including nuts, bolts, etc.

5.1.2 Power usage

IMPORTANT!

The controller continues to draw power from the power system even when it appears to be off. Therefore, if the power supply is active, the battery may be drained unless it is being actively charged.

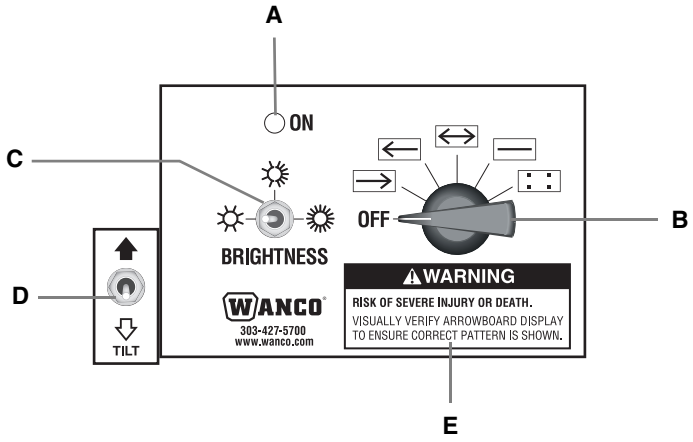
In cases where battery power is being supplied to the arrow board system but the battery is not being actively charged, such as when the truck's 12-volt system provides power and the truck engine is off:

- The battery charge will be drained quickly by an arrow board with a power-tilt frame if the tilt-frame actuator is operating and the arrow board is moving up or down. The actuator does not draw power unless it is in use.
- The battery charge will be drained slowly by an arrow board that is showing a display pattern (an arrow or caution pattern). The lights on the arrow board draw a negligible amount of power.
- The battery charge will be drained slowly by a controller, because the controller does not have an on/off switch.
  - ☐ The controller has an LED power indicator that is lit when power is applied to the arrow board.
  - ☐ Although the indicator is not lit while the arrow board display is switched off, the controller is on and drawing power. The controller draws a negligible amount of power, even when it is not in use.
- The battery charge will not be drained by an arrow board that is blank (not showing a display pattern). The arrow board only draws power when it is showing an arrow or caution pattern. Power is applied only to the lights that are on.

5.2 Controller

The 5-pattern controller includes the components called out in Figure 5-1.

Figure 5-1. 5-pattern controller



A – Display on/off indicator
B – 5-pattern selector switch (display is blank when set to OFF)
C – Display brightness control switch
D – Power-tilt switch (if installed)
E – Hazard notice

5.2.1 Power on/off

The pattern selection switch has an OFF position that turns off power to the arrow board display. In any position other than OFF, power to the display is on.

The controller is on and drawing power while the power system is on. The controller does not have an on/off switch.

IMPORTANT!

It is important to understand when the arrow board and controller are drawing power from the power system. Before operating the arrow board, refer to Section 5.1.2, page 26.

5.2.2 Pattern selection and display

To choose a display pattern for the arrow board, rotate the pattern selector switch to the desired pattern. To blank the display, set the switch to OFF. For examples of all available patterns, see Figure 1-1, page 2.

The ON LED indicator is lit when a pattern is selected, meaning the arrow board is powered and displays a pattern.

Always visually inspect the arrow board after selecting a pattern.

5.2.3 Power-tilt

If the arrow board is equipped with an electrically powered tilt frame, press and hold the tilt switch to raise and lower the arrow board while power is on. When you release the switch, the tilt-frame stops moving.

For an arrow board with a 180-degree power-tilt frame, the tilt switch allows you to operate the tilt frame continuously, so the arrow board can face forward, rearward, or down when it is not in use.

When the arrow board reaches the end of its range of motion, the actuator makes a clicking or ratcheting sound. This sound is normal and is not an indication of damage to the actuator. When you hear this sound, release the switch.

5.2.4 Brightness

The BRIGHTNESS toggle switch has three positions:

Dim	For nighttime use or when daylight glare is low
Bright	For daytime use and when daylight glare is high
Auto-brightness	For an arrow board equipped with a photocell, automatically adjusts display brightness based on ambient light: dim at night and bright during the day For an arrow board that does not have a photocell, this setting behaves the same as the Dim setting For photocell location, see Figure 7-1, page 31

5.3 Tilt-frames

5.3.1 Power operated

For an arrow board with a factory power-tilt frame, use the arrow board controller to operate the tilt mechanism.

For an arrow board with a factory 180-degree power-tilt frame, the controller allows you to operate the tilt frame continuously, so the arrow board can face forward, rearward, or down when it is not in use.

5.3.2 Manually operated

The Wanco Auto-Lock Frame is a manually operated tilt frame that allows the arrow board to tilt from horizontal to vertical. It has a spring-loaded pin that automatically engages to lock the frame in position at 90-degree intervals.

To tilt the arrow board on the auto-lock frame, pull the locking-pin out, away from the arrow board, and then tilt the arrow board. Release the pin when the arrow board begins to move. The pin will automatically lock the arrow board when it is tilted 90 degrees, snapping into place with an audible “click.”

6 Troubleshooting

6.1 Before troubleshooting

Before performing any troubleshooting or servicing on the arrow board, observe all safety precautions in Section 2, page 5.

6.2 Control system

If the arrow board is not working, the light on the control panel isn't lit, and the arrow board does not respond when you use the controller:

- Ensure the arrow board controller has power. Check the power supply, cables, and wiring connections.
- The control system may have failed. Contact the Wanco Service Department for assistance (see Section 1.6, page 4).

6.3 Arrow board lights not working

If any lights on the front or back of the arrow board do not light up as expected, the most likely cause is faulty wiring or a bad wiring connection.

To check the wiring of any light on the arrow board:

1. On the front of the display, remove the visor from the light:
   - For a rectangular arrow board, see Section 7.4.2, page 33.
   - For a split arrow board, see Section 7.4.3, page 34.
2. Carefully remove the light from the cabinet.
3. Check its wiring connections to ensure they are proper and secure. Check wiring for wear and damage.
4. Replace wiring if necessary or contact the Wanco Service Department for assistance (see Section 1.6, page 4).

7 Maintenance

7.1 General maintenance

When performing any maintenance on the system, follow the safety requirements in Section 2, page 5.

⚠ WARNING

If the arrow board is not working properly, a traffic accident could occur, resulting in serious injury or death.

After maintenance, before sending the arrow board back into service, verify all display lights are functioning properly.

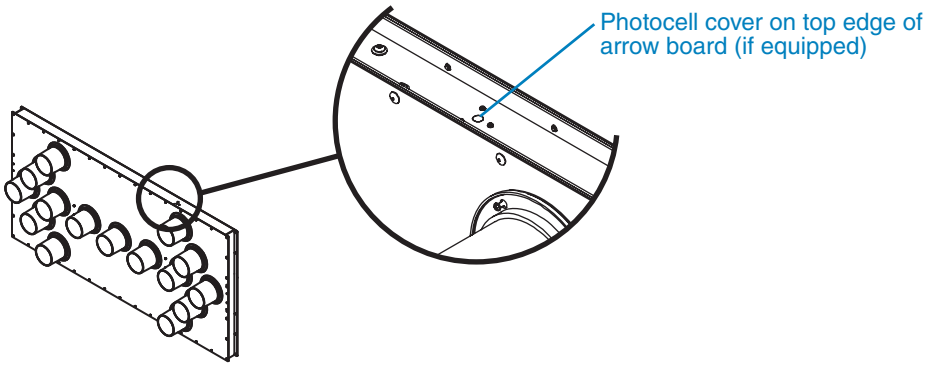
⚠ CAUTION

During maintenance, adverse weather conditions can cause equipment damage and injury.

Whenever possible, perform maintenance indoors or in calm dry weather, and away from traffic.

- Always be aware of traffic when performing roadside maintenance.
- Repair or replace worn and damaged components immediately. Never use any equipment that is damaged or in need of repair.
- For reliable performance, keep the arrow board and all its components clean.
- If the arrow board has a photocell (see Figure 7-1), keep the photocell cover clean. Use a soft, damp cloth.

Figure 7-1. Photocell location



7.2 Periodic maintenance

When performing any maintenance on the system, follow the safety requirements in Section 2, page 5.

- The arrow board display has 15, 14, or 13 LED lights.
  - ☐ Check the display lights for proper operation.
  - ☐ Replacement lights are available from the factory (see Section 1.6, "Where to obtain service," page 4).
  - ☐ To replace a light, see Section 7.4.
- At least once a week:
  - ☐ Check external cables and wires for signs of wear or damage. Repair or replace cables and wires when worn or damaged.
  - ☐ If the arrow board is installed on a tilt frame, check pivot points and moving parts for wear and damage. Repair or replace as needed.
- At least once a month:
  - ☐ Check all mounting brackets, including nuts and bolts, to ensure they are properly tightened and secure. Tighten, repair, or replace as needed.
  - ☐ Check all screws that attach visors over LED lights on arrow board display. Screws can loosen over time. Tighten whenever necessary.

7.3 Lubrication

When performing any maintenance on the system, follow the safety requirements in Section 2, page 5.

To lubricate moving parts, use any common lubrication grease.

The lubrication schedule may vary depending on location, application, and frequency of use. Follow the schedule listed in Table 7-1 or set a more frequent schedule if needed for your arrow board and your application.

Table 7-1. Lubrication schedule

Frequency	Instructions
At least weekly	If the arrow board is installed on a tilt-frame with an electric actuator, lubricate the actuator's top and bottom pivot points.
At least monthly	If the arrow board is installed on a tilt frame, lubricate the pivot points.
As needed	Lubricate all other moving parts
Always	Wipe away any extra or spilled grease

7.4 Replacing a light or visor

7.4.1 Overview

When performing any maintenance on the system, follow the safety requirements in Section 2, page 5.

The procedure to replace an LED light or visor depends on the type of arrow board:

- For a rectangular arrow board, refer to Section 7.4.2.
- For a split arrow board, refer to Section 7.4.3.

7.4.2 Rectangular arrow board

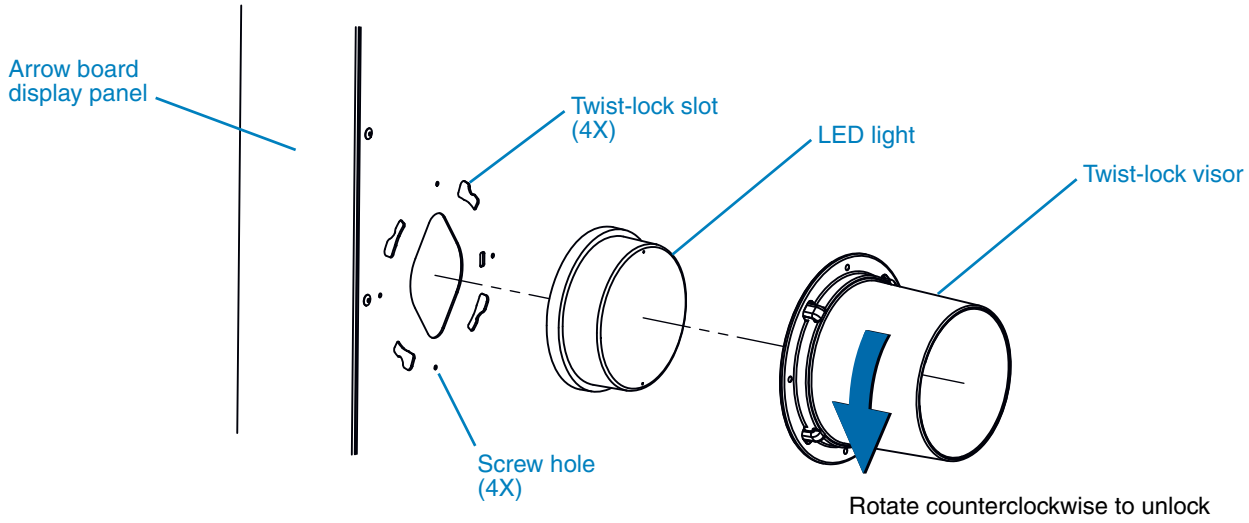
Visors secure the lights to the front of the arrow board display panel.

- To replace a light, you must first remove its visor.
- Wanco's twist-lock visors do not require screws to hold them in place, but screws may be used if desired.

To replace an LED light or visor on the arrow board display, refer to Figure 7-2, page 34, and follow these steps:

1. Follow the safety requirements in Section 2, page 5.
2. Shut off power to the arrow board, either by using the controller, by shutting off the vehicle engine, or by disconnecting its power supply.
3. If screws are holding the visor in place, loosen the screws.
4. Either by grasping the visor tightly or using a standard strap wrench, rotate the visor counterclockwise about an inch (2.5cm) to unlock it. Avoid pulling the visor out from the display panel while rotating.
5. When the visor is unlocked, gently pull it away from the panel. The light will be loose when you remove the visor. Hold the light in place and use care not to let it fall.
6. If replacing a light, gently pull the light away from the display panel and disconnect its wiring, then reverse the procedure to install the new light and its visor.
7. If replacing a visor, reverse the procedure to install a replacement. When installing a new Wanco twist-lock visor, screws are not necessary but may be used if desired.

Figure 7-2. Twist-lock visor detail

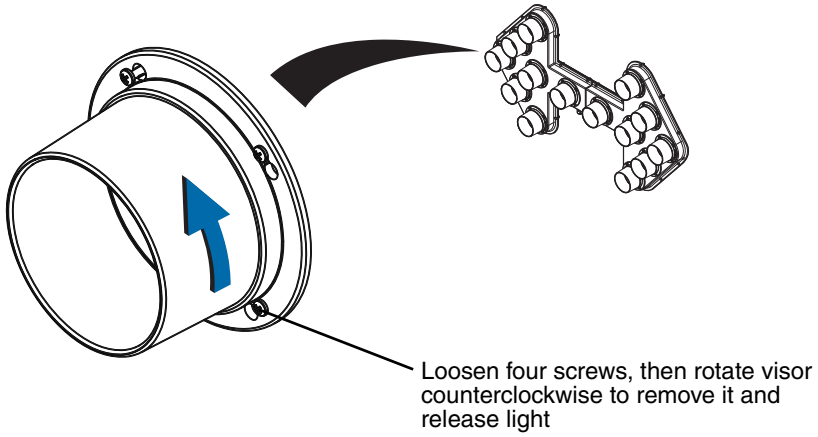


7.4.3 Split arrow board

To replace an LED light or visor on the split arrow board display, refer to Figure 7-3 and follow these steps:

1. Follow the safety requirements in Section 2, page 5.
2. Shut off power to the arrow board, either by using the controller, by shutting off the vehicle engine, or by disconnecting its power supply.
3. Four screws hold the visor in place. Loosen the screws and rotate the visor counterclockwise slightly to unlock it.
4. When the visor is unlocked, gently pull it away from the panel. The light will be loose when you remove the visor. Hold the light in place and use care not to let it fall.
5. If replacing a light, gently pull the light away from the display panel and disconnect its wiring, then reverse the procedure to install the new light and its visor.
6. If replacing a visor, reverse the procedure to install a replacement.

Figure 7-3. Split arrow visor detail



7.5 Storing the arrow board

IMPORTANT!

It is important to understand when the arrow board and controller are drawing power from the power system. Before storing the arrow board, refer to Section 5.1.2, page 26.

Before storing the arrow board, switch off the arrow board (see Section 5.2.1, page 27). If necessary, disconnect the controller from power.

7.6 Wiring

Before performing any type of service or maintenance, read and observe all safety instructions. See Section 2, page 5.

For wiring diagrams, see Table 7-2.

Table 7-2. Wiring diagrams

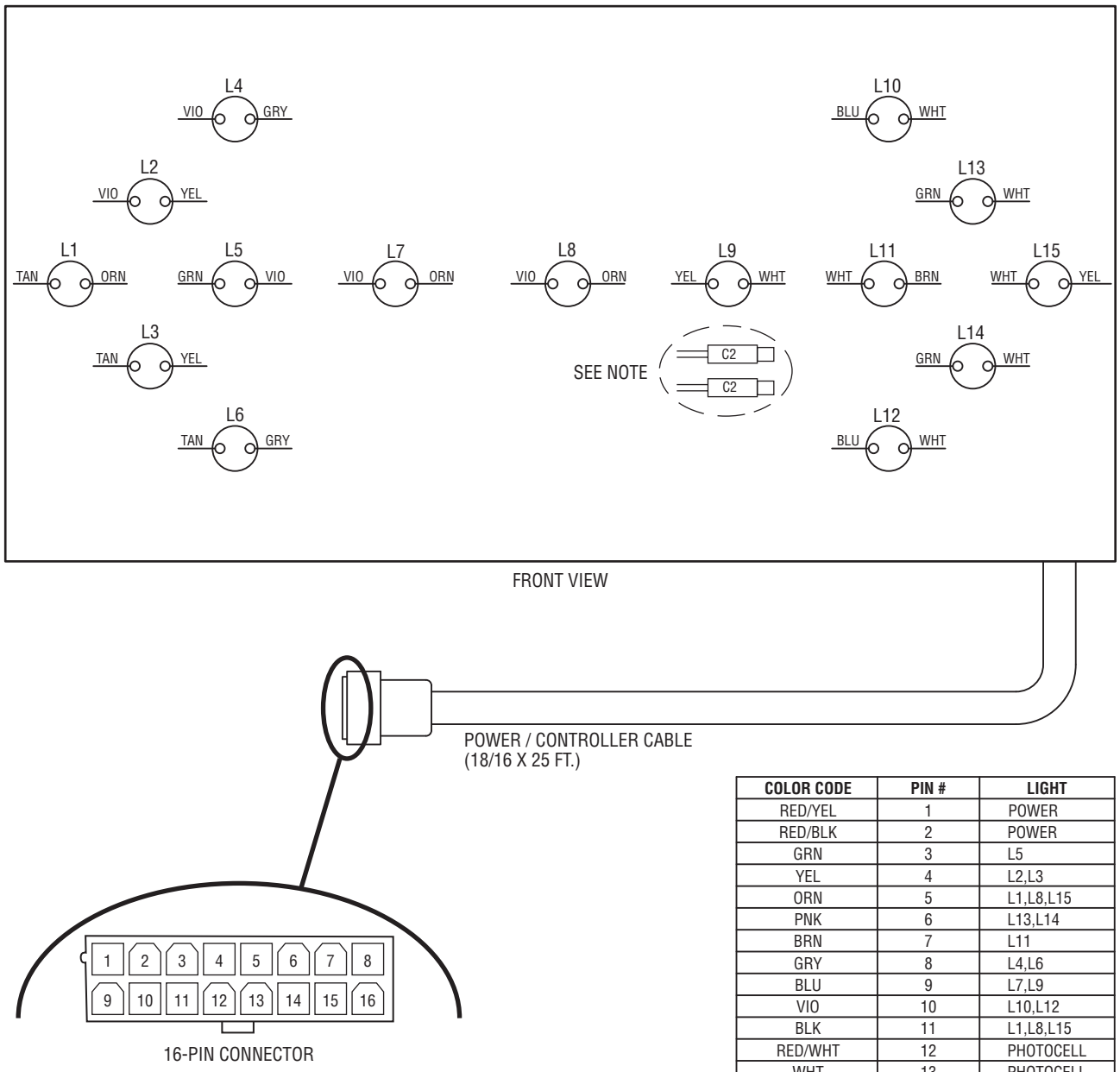
Description	Page
System wiring, 15-light arrow board	Figure 7-4, page 36
System wiring, 13-light arrow board	Figure 7-5, page 37
System wiring, 14-light split arrow board	Figure 7-6, page 38

7.7 Replacement Parts

Before performing any type of service or maintenance, read and observe all safety instructions. See Section 2, page 5.

For replacement parts, contact the Wanco Service Department (see Section 1.6, "Where to obtain service," page 4).

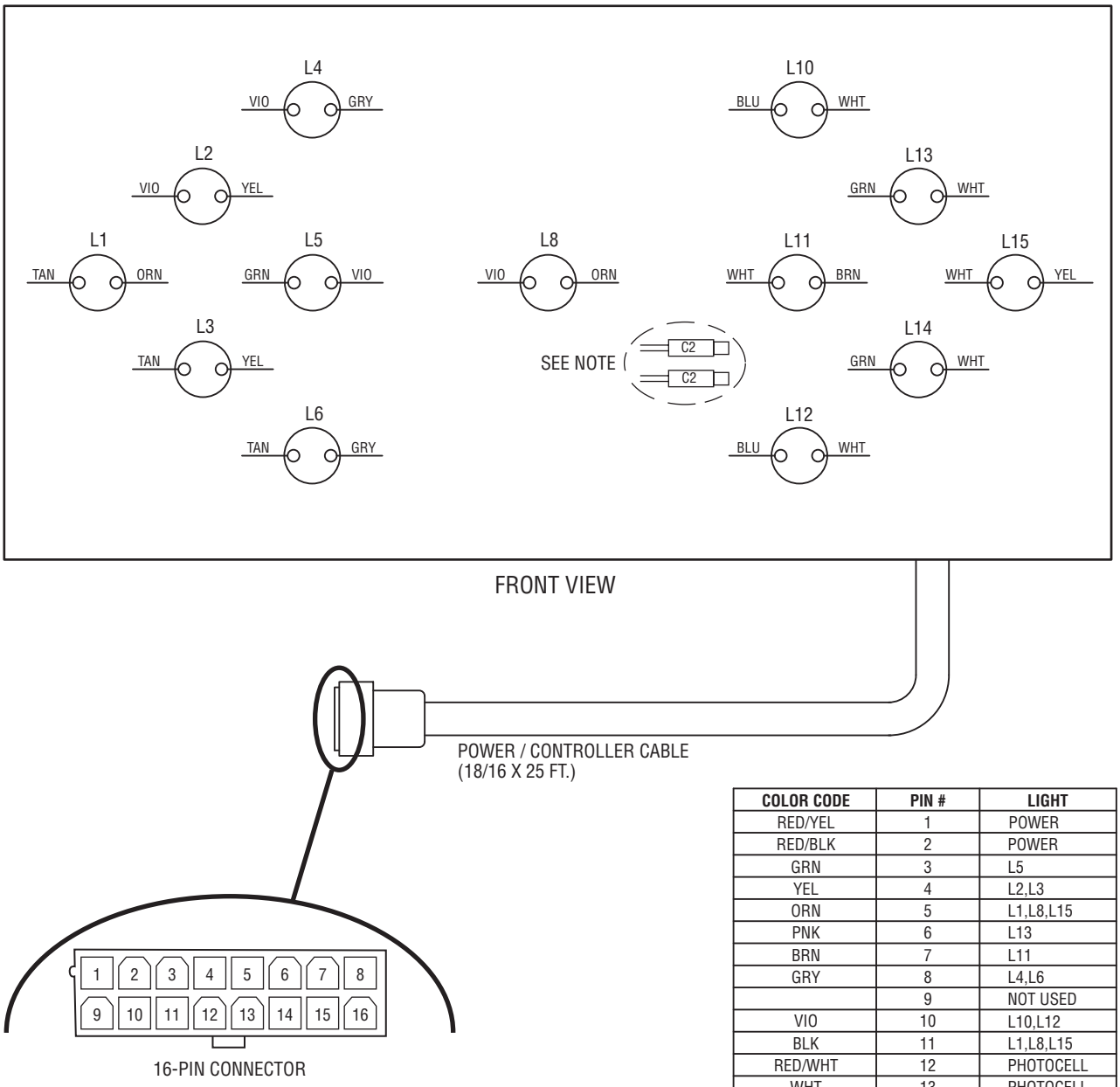
Figure 7-4. Wiring diagram: 15-light models



COLOR CODE	PIN #	LIGHT
RED/YEL	1	POWER
RED/BLK	2	POWER
GRN	3	L5
YEL	4	L2,L3
ORN	5	L1,L8,L15
PNK	6	L13,L14
BRN	7	L11
GRY	8	L4,L6
BLU	9	L7,L9
VIO	10	L10,L12
BLK	11	L1,L8,L15
RED/WHT	12	PHOTOCELL
WHT	13	PHOTOCELL
TAN	14	POWER
RED/GRN	15	POWER
RED	16	POWER

NOTE: +12VDC C2 CONNECTORS ACCESSIBLE THROUGH L11 MOUNTING HOLE

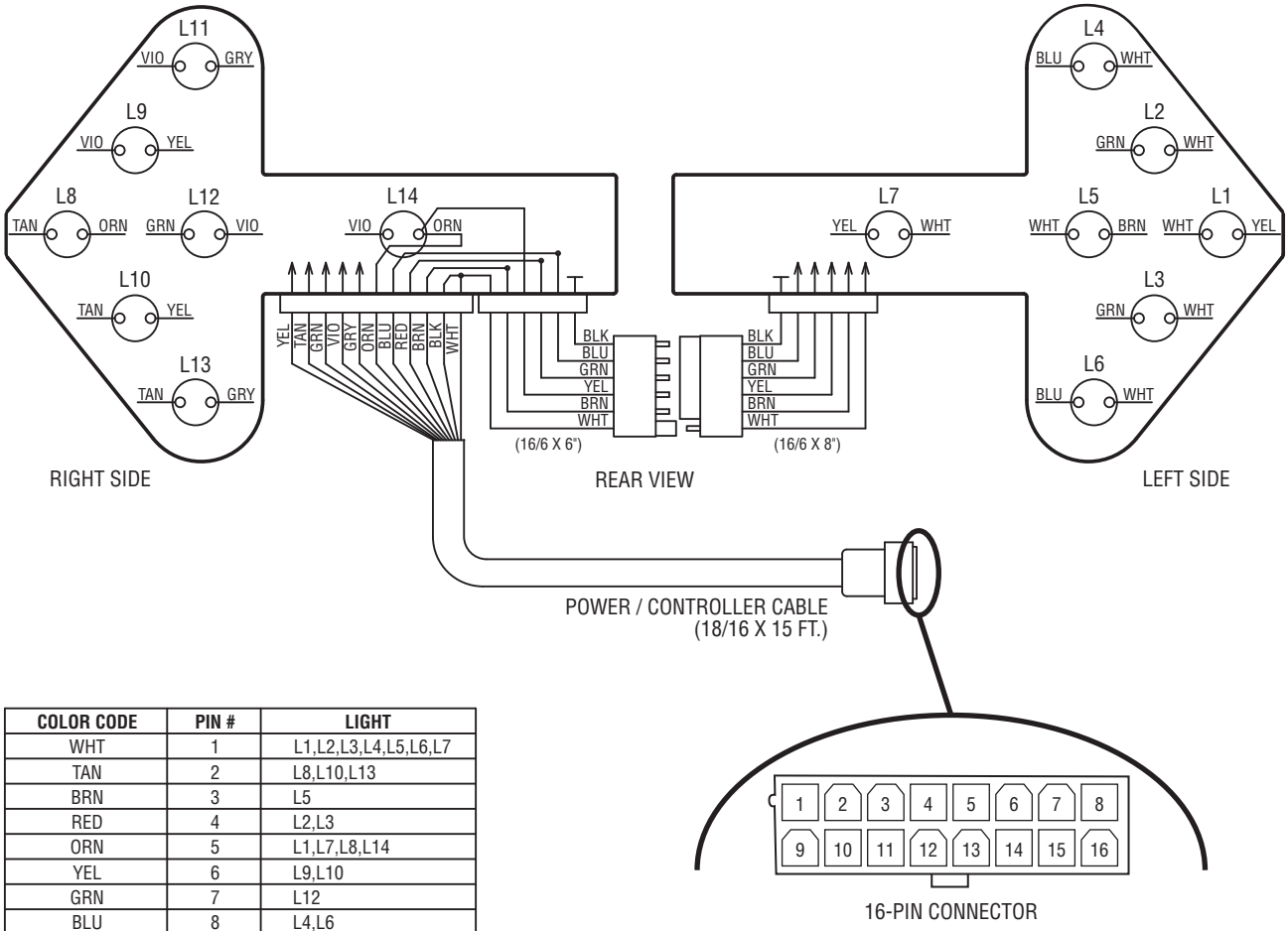
Figure 7-5. Wiring diagram: 13-light models



COLOR CODE	PIN #	LIGHT
RED/YEL	1	POWER
RED/BLK	2	POWER
GRN	3	L5
YEL	4	L2,L3
ORN	5	L1,L8,L15
PNK	6	L13
BRN	7	L11
GRY	8	L4,L6
	9	NOT USED
VIO	10	L10,L12
BLK	11	L1,L8,L15
RED/WHT	12	PHOTOCELL
WHT	13	PHOTOCELL
TAN	14	POWER
RED/GRN	15	POWER
RED	16	POWER

NOTE: +12VDC C2 CONNECTORS ACCESSIBLE THROUGH L11 MOUNTING HOLE

Figure 7-6. Wiring diagram: split arrows

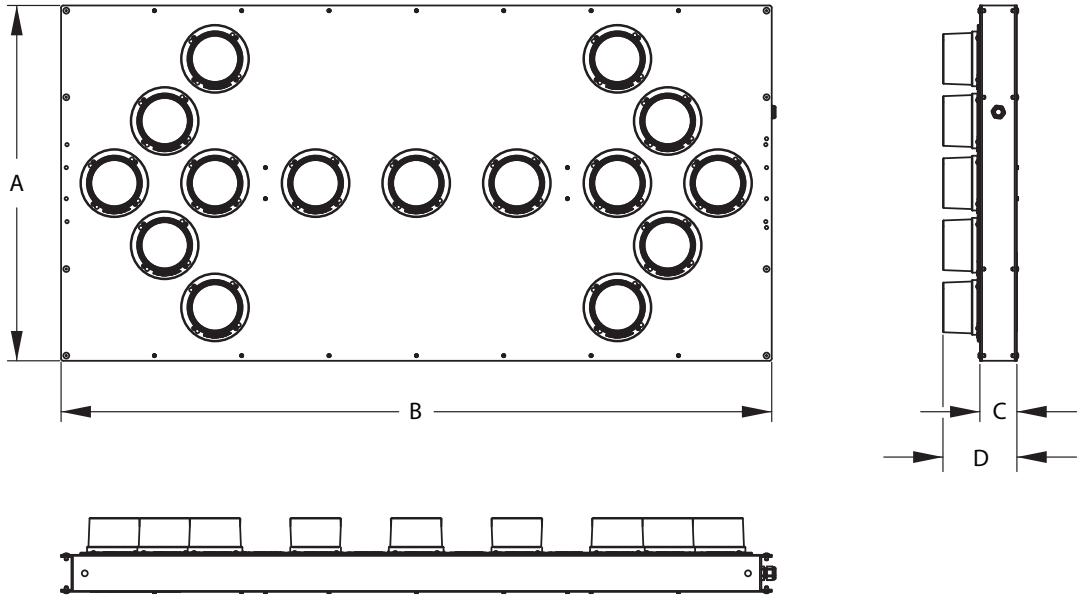


COLOR CODE	PIN #	LIGHT
WHT	1	L1,L2,L3,L4,L5,L6,L7
TAN	2	L8,L10,L13
BRN	3	L5
RED	4	L2,L3
ORN	5	L1,L7,L8,L14
YEL	6	L9,L10
GRN	7	L12
BLU	8	L4,L6
GRY	10	L11,L13
BLK	15	L1,L2,L3,L4,L5,L6,L7
VIO	16	L9,L11,L12,L14
PNK	NOT USED	
RED/YEL	NOT USED	
RED/GRN	NOT USED	
RED/WHT	NOT USED	
RED/BLK	NOT USED	

Appendix
A Sizes and Dimensions

A.1 Rectangular arrow boards

Figure A-1. Arrow board without mounting frame



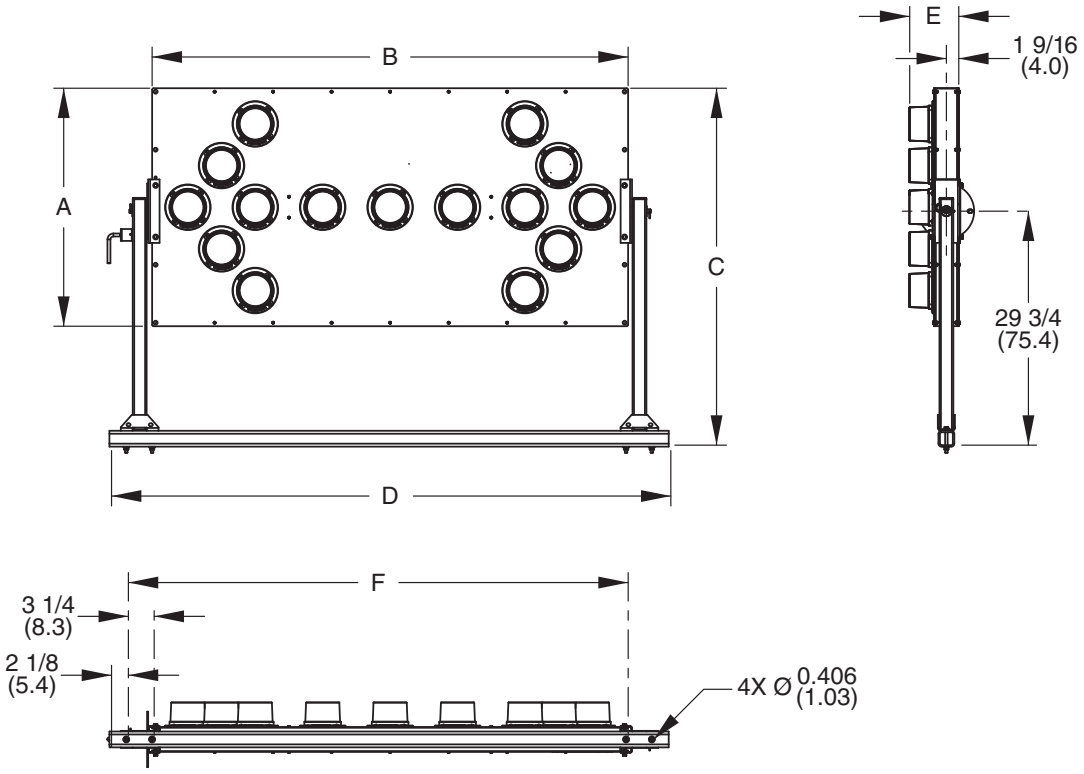
Dimensions in inches (cm)

Arrow board size	A	B	C	D	Weight, approx. lbs. (kg)
24×48	24 (60.9)	48 (121.9)	3 1/8 (7.9)	6 3/16 (15.8)	42 (19)
30×60	30 (76.2)	60 (152.4)	3 1/8 (7.9)	6 3/16 (15.8)	72 (33)
36×72	36 (91.4)	72 (182.8)	3 1/8 (7.9)	8 1/4 (21.0)	100 (45)
48×96	48 (121.9)	96 (243.8)	3 1/8 (7.9)	8 1/4 (21.0)	112 (51)

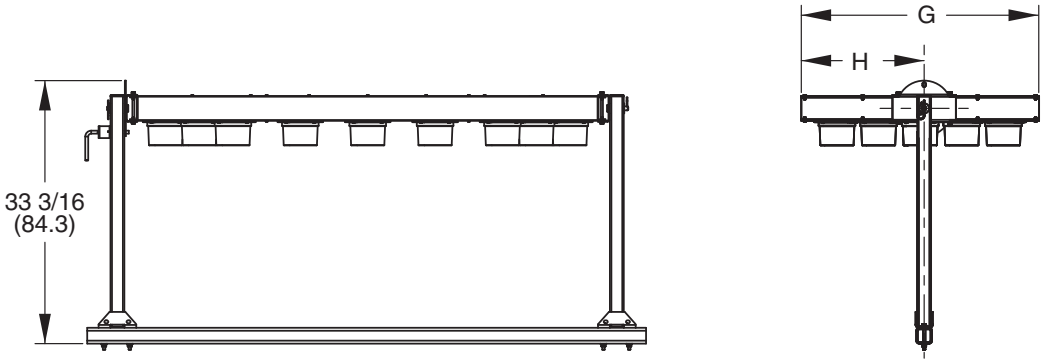
Figure A-2. Arrow board with manual-tilt (auto lock) frame

Dimensions in inches (cm)

Deployed



Travel position

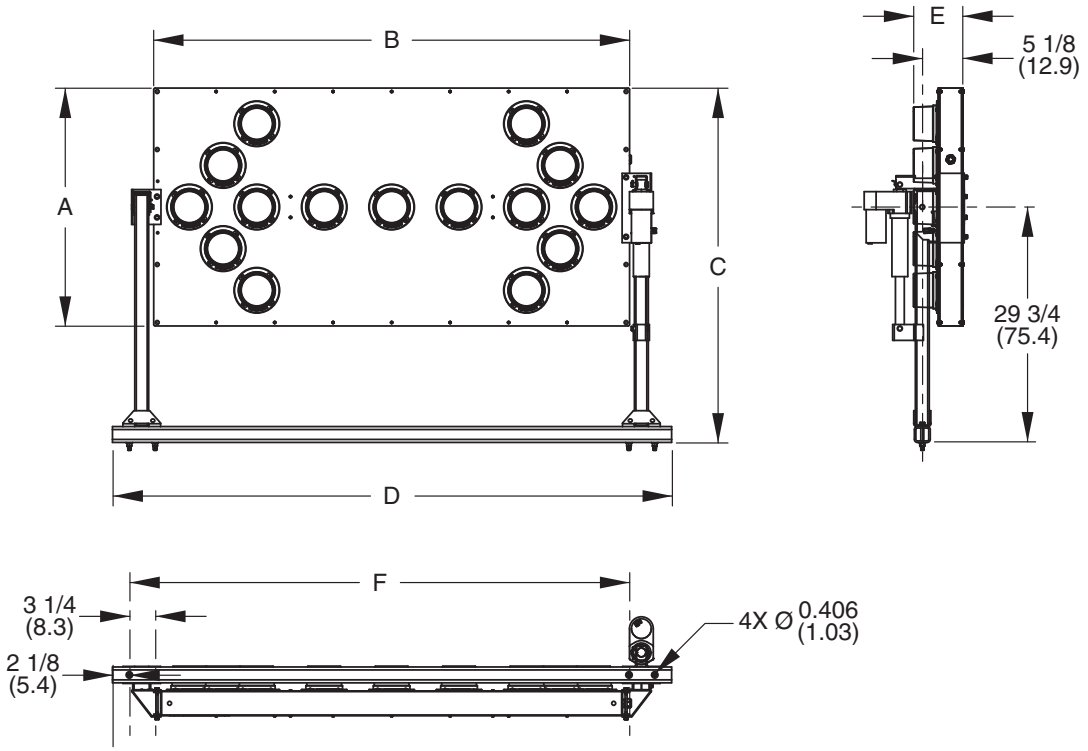


Arrow board size	A	B	C	D	E	F	G	H	Weight, approx. lbs. (kg)
24×48	24 (60.9)	48 (121.9)	41 3/4 (106.1)	58 1/2 (148.6)	6 3/16 (15.8)	51 (129.5)	24 (60.9)	12 (30.5)	92 (41)
30×60	30 (76.2)	60 (152.4)	44 3/4 (113.7)	70 1/2 (179.1)	6 3/16 (15.8)	63 (160.0)	30 (76.2)	15 (38.1)	122 (55)
36×72	36 (91.4)	72 (182.8)	47 3/4 (121.3)	82 1/2 (209.6)	8 1/4 (21.0)	75 (190.5)	36 (91.4)	18 (45.7)	150 (67)
48×96	48 (121.9)	96 (243.8)	53 3/4 (136.5)	106 1/2 (270.5)	8 1/4 (21.0)	99 (251.5)	48 (121.9)	24 (60.9)	162 (73)

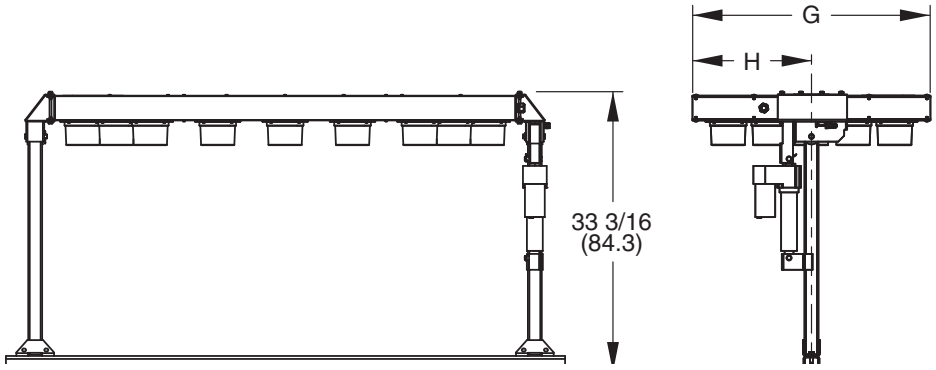
Figure A-3. Arrow board with 90-degree power-tilt frame

Dimensions in inches (cm)

Deployed



Travel position

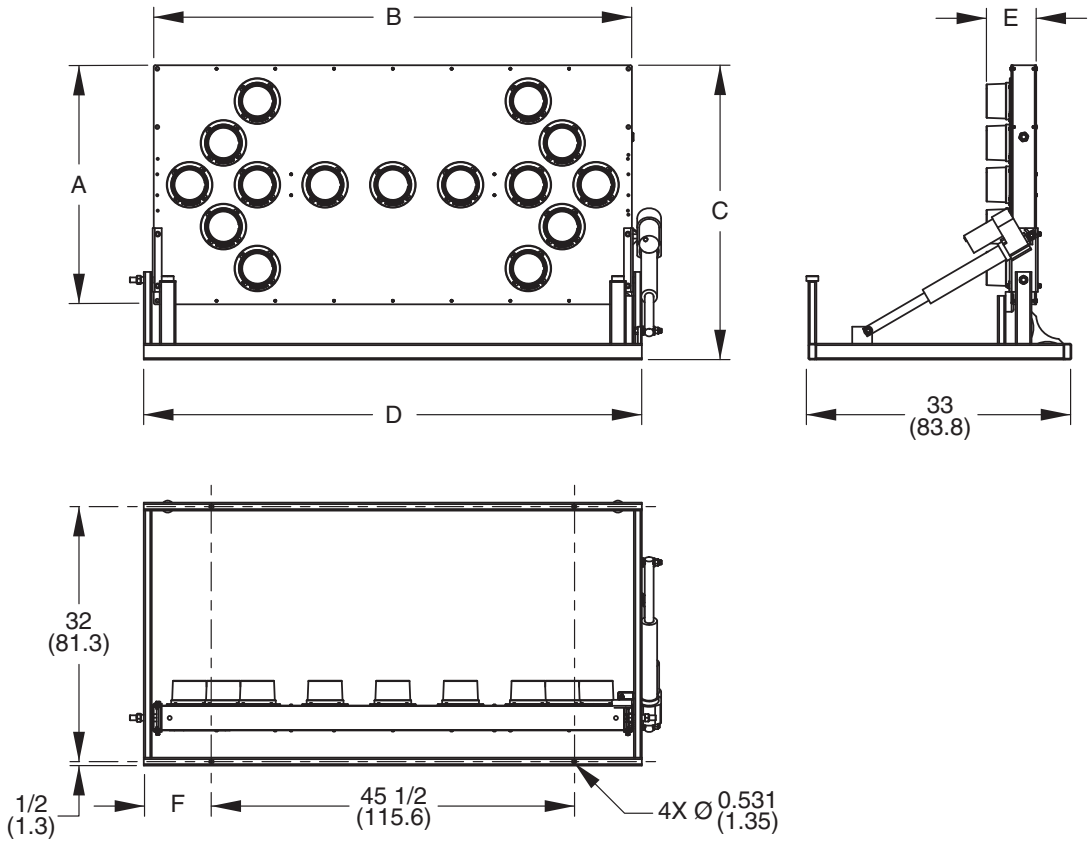


Arrow board size	A	B	C	D	E	F	G	H	Weight, approx. lbs. (kg)
24×48	24 (60.9)	48 (121.9)	41 3/4 (106.1)	58 1/2 (148.6)	6 3/16 (15.8)	51 (129.5)	24 (60.9)	12 (30.5)	112 (51)
30×60	30 (76.2)	60 (152.4)	44 3/4 (113.7)	70 1/2 (179.1)	6 3/16 (15.8)	63 (160.0)	30 (76.2)	15 (38.1)	142 (65)
36×72	36 (91.4)	72 (182.8)	47 3/4 (121.3)	82 1/2 (209.6)	8 1/4 (21.0)	75 (190.5)	36 (91.4)	18 (45.7)	170 (77)
48×96	48 (121.9)	96 (243.8)	53 3/4 (136.5)	106 1/2 (270.5)	8 1/4 (21.0)	99 (251.5)	48 (121.9)	24 (60.9)	182 (83)

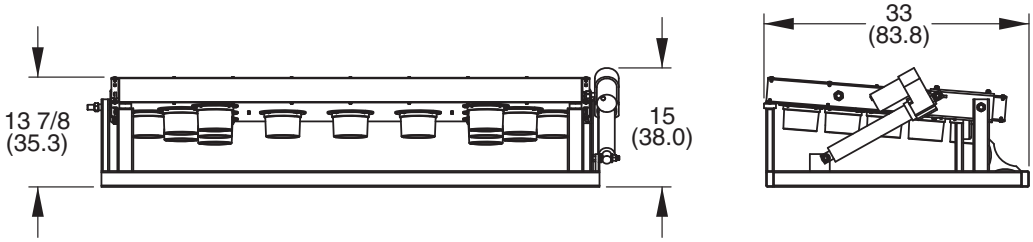
Figure A-4. Arrow board with 90-degree low-profile power-tilt frame

Dimensions in inches (cm)

Deployed



Travel position

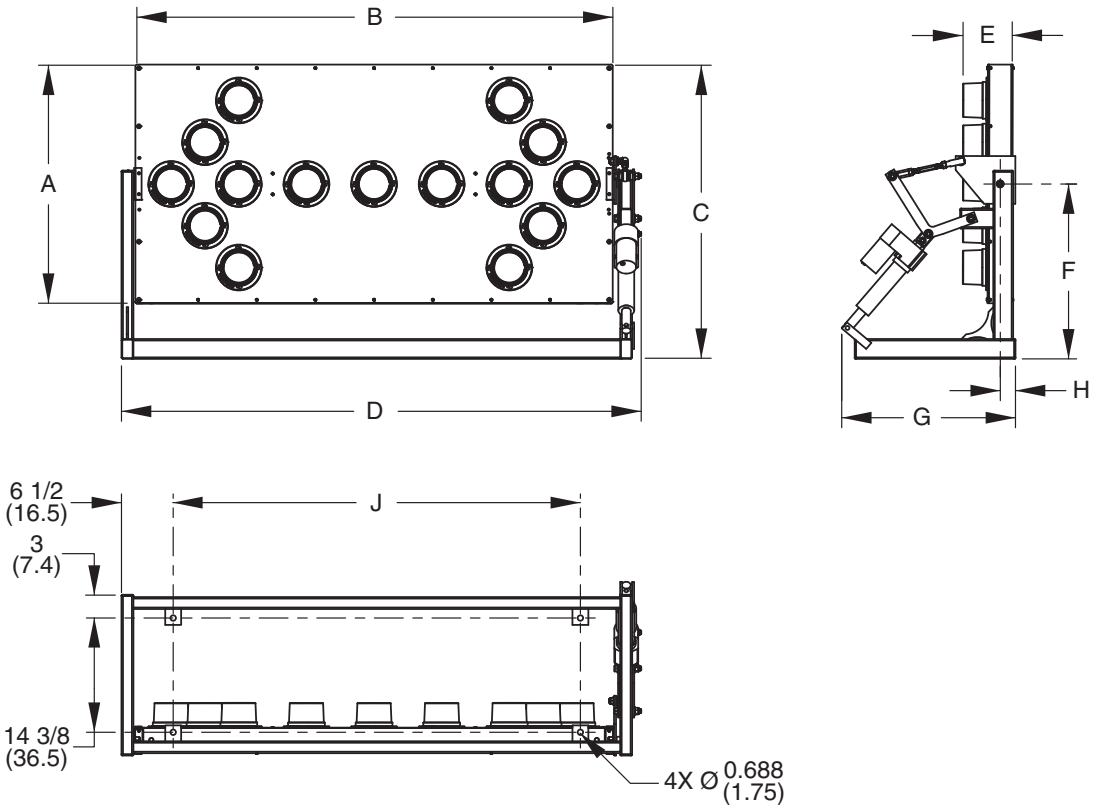


Arrow board size	A	B	C	D	E	F	Weight, approx. lbs. (kg)
30×60	30 (76.2)	60 (152.4)	37 (94.0)	62 1/2 (158.8)	6 3/16 (15.8)	8 1/2 (21.6)	132 (60)
36×72	36 (91.4)	72 (182.8)	39 (99.1)	74 1/2 (189.2)	8 1/4 (21.0)	14 1/2 (36.8)	160 (72)

Figure A-5. Arrow board with 180-degree power-tilt frame

Dimensions in inches (cm)

Rear facing

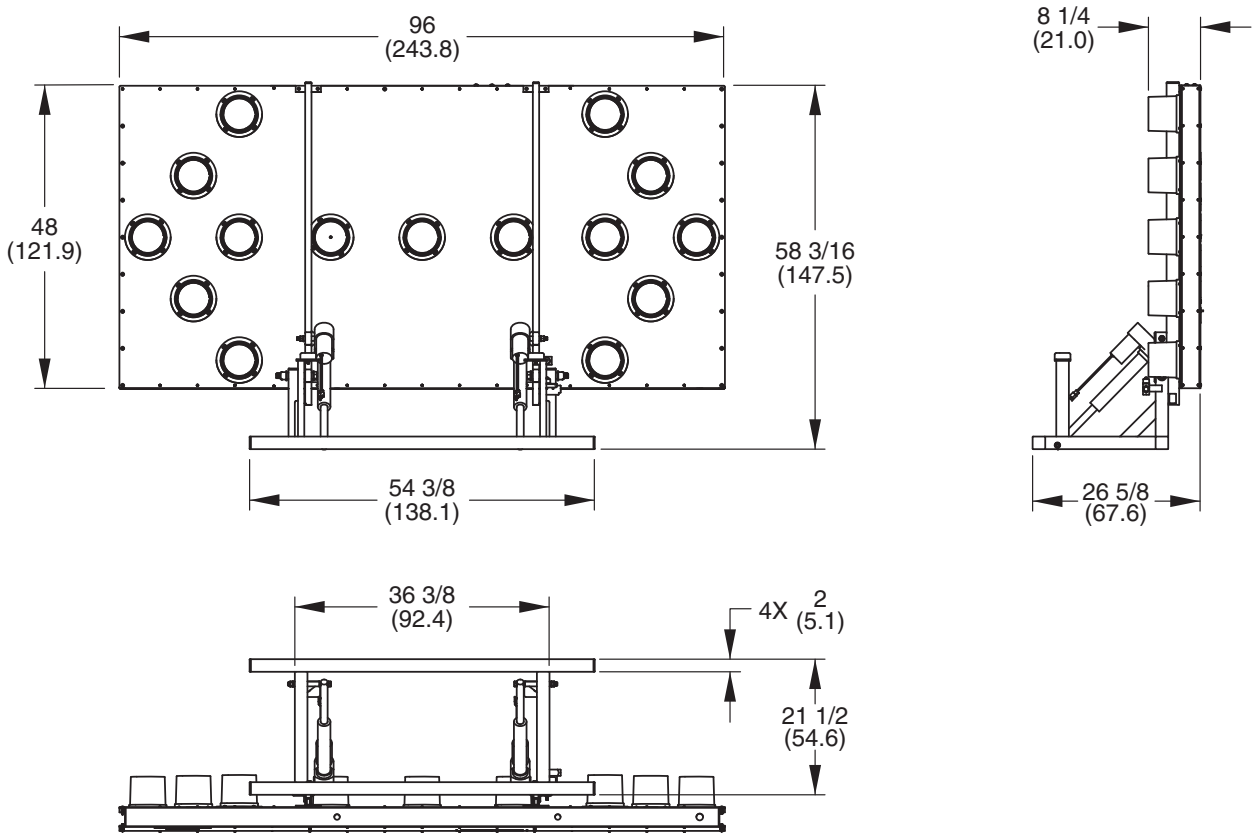


Arrow board size	A	B	C	D	E	F	G	H	J	Weight, approx. lbs. (kg)
30×60	30 (76.2)	60 (152.4)	37 (94.0)	65 3/8 (166.0)	6 3/16 (15.8)	22 (55.9)	21 7/8 (55.4)	1 15/16 (4.9)	51 3/16 (130.0)	182 (83)
36×72	36 (91.4)	72 (182.8)	40 (101.6)	77 3/8 (196.4)	8 1/4 (21.0)	21 7/8 (55.6)	21 3/4 (55.2)	1 13/16 (4.6)	63 3/16 (160.5)	210 (95)

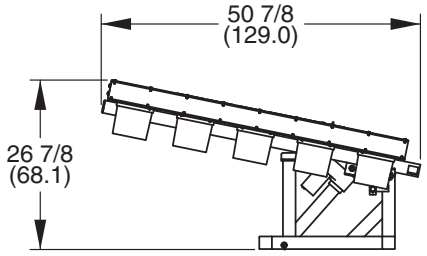
Figure A-6. Arrow board with low-profile trailer-mount frame

Dimensions in inches (cm)

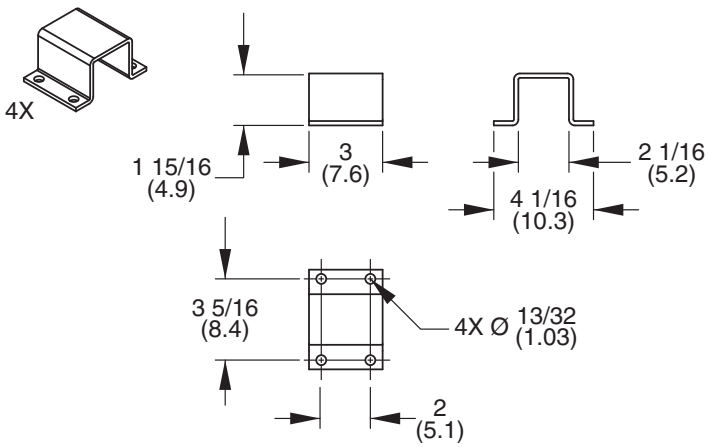
Deployed



Travel position



Mounting brackets



A.2 Split arrow boards

Figure A-7. Split arrows without mounting frame

Dimensions in inches (cm)

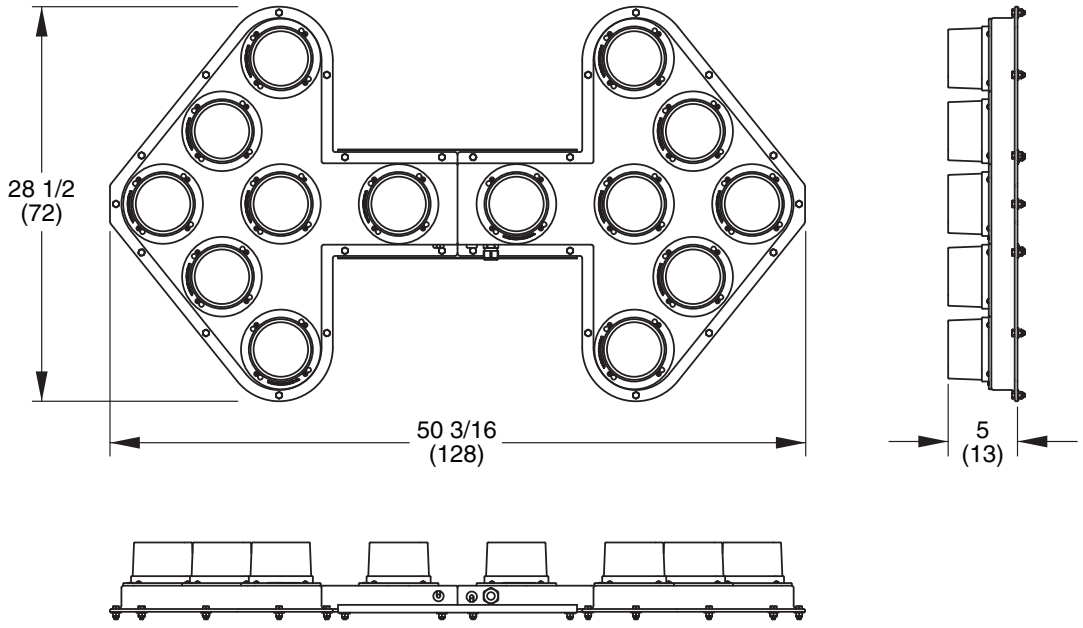
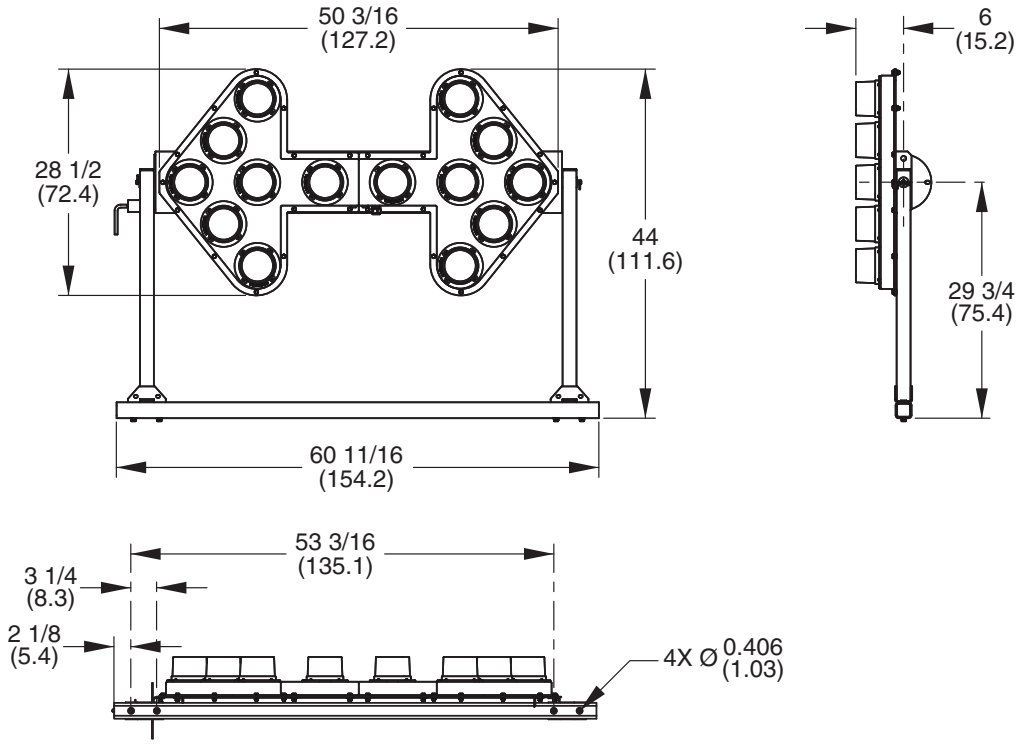


Figure A-8. Split arrows with manual-tilt (auto lock) frame

Dimensions in inches (cm)

Deployed



Travel position

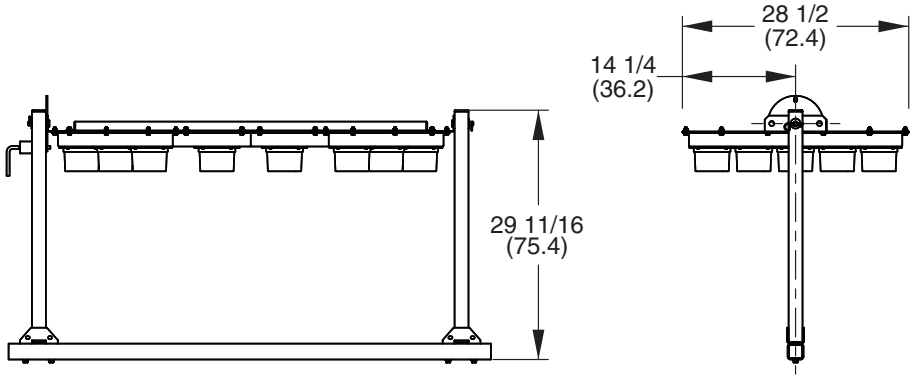
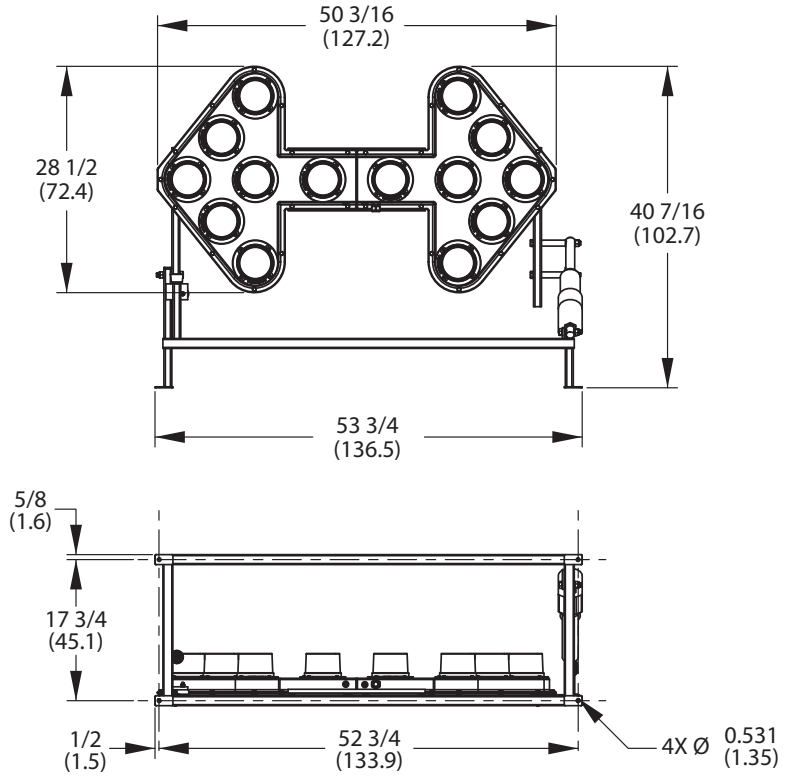


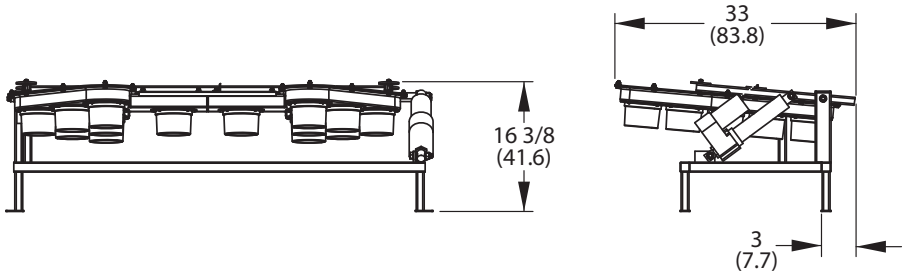
Figure A-9. Split arrows with 90-degree low-profile power-tilt frame

Dimensions in inches (cm)

Deployed



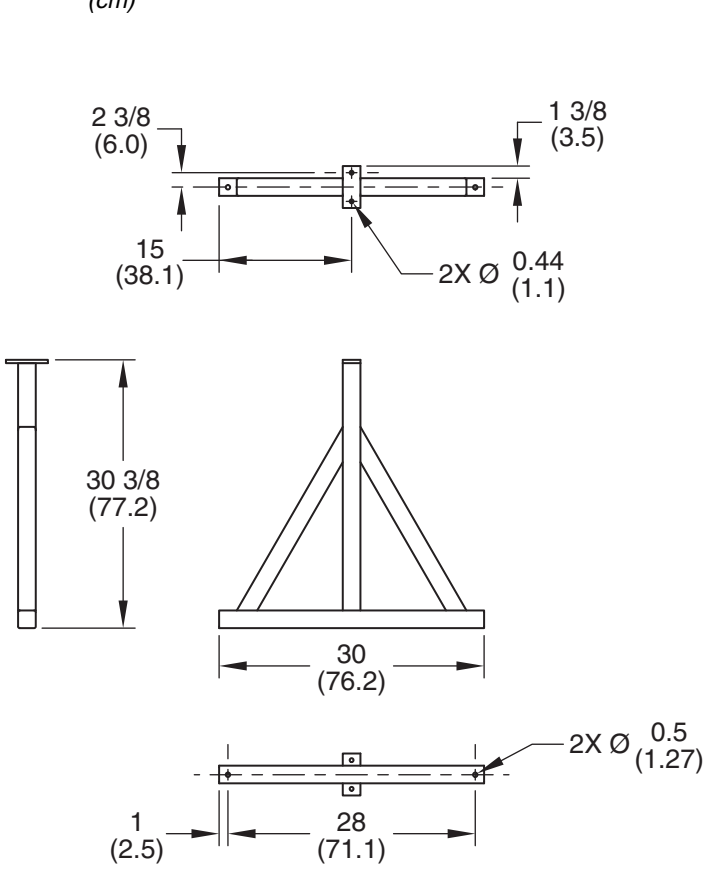
Travel position



A.3 Truck-bed brackets

Figure A-10. Truck-bed brackets

Dimensions in inches (cm)



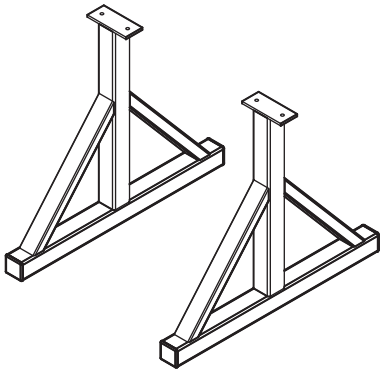
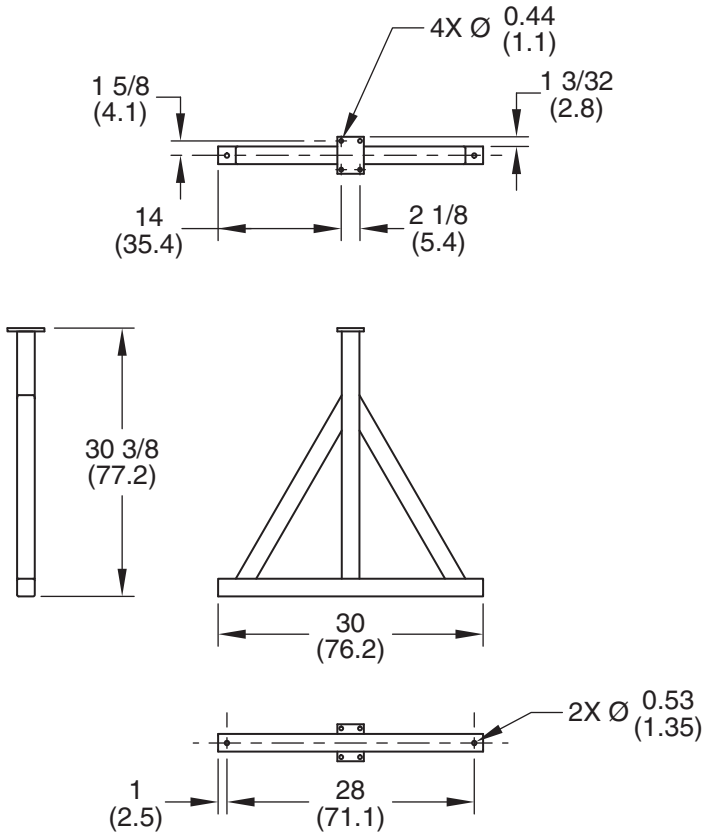
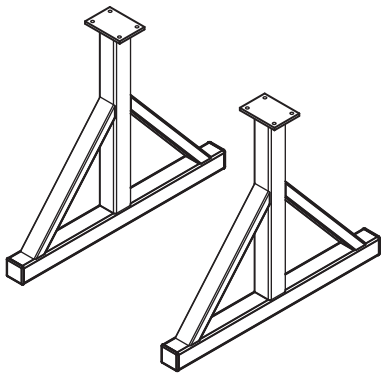


Figure A-11. Truck-bed brackets for 48×96 size arrow boards

Dimensions in inches (cm)





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