



# RoadStar Sign Installation Manual

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August 18, 2010

Dynamic outdoor advertising solutions

Part Number 1175610102 rev.A

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# Introduction

## Purpose

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This manual is intended as a guide for installing a RoadStar sign and is intended for sign installers.

## Revision history

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Revision	Date	Notes
1175610102 rev.A	August 4, 2008	Included sign ventilation requirements and warranty information as well as updated the manual layout. Updated installation instructions for wiring multiple sign sections.
97175021A	April 30, 2007	Initial Release

## Safety information

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### Equipment symbols



Chassis ground



Mains power (1 = ON, 0 = OFF)

### Warnings and cautions

Warnings, cautions and notices are posted in appropriate locations throughout this manual.

## Equipment protection

### Preventing electrostatic discharge (ESD)

This equipment contains components that may be damaged by “static electricity”, or electrostatic discharge. To prevent this from happening, be sure to follow the guidelines in Adaptive Tech Memo 00-0005, “*Preventing Electrostatic Discharge (ESD) Damage*,” available on our Web site at <http://www.adaptivedisplays.com>.

### EMI compliance

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment.

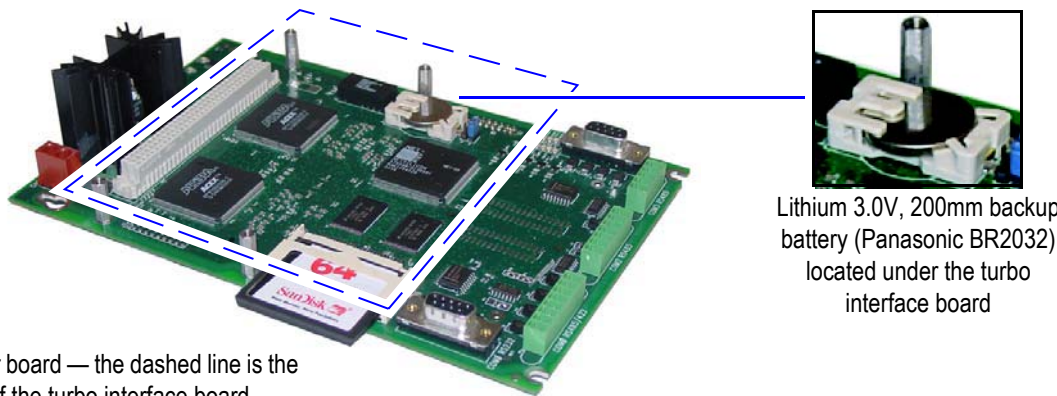
This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with installation guidelines, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case the user will be required to correct the interference at his own expense.

### Battery backup

In the event of power loss, backup batteries in an AlphaEclipse sign provide power to save messages and time settings.

A lithium backup battery is located on the controller board, *under* the turbo interface board (see below). The backup battery should only be replaced by a qualified Adaptive technician.

**WARNING!** Danger of explosion if battery is incorrectly replaced.



Controller board — the dashed line is the location of the turbo interface board.

Lithium 3.0V, 200mm backup battery (Panasonic BR2032) located under the turbo interface board

**Figure 1.** Battery locations on the controller board

# Equipment description

## Overview

The AlphaEclipse RoadStar series LED sign displays text and graphics. Messages are created using AlphaNet software and transmitted to one or more signs by wire, fiber optic cable, modem, or wireless transceiver.

## Modular construction

AlphaEclipse RoadStar signs are built using modular construction. That is, a sign may be built from smaller sections, or modules as shown below:

### 64mm Sign modules

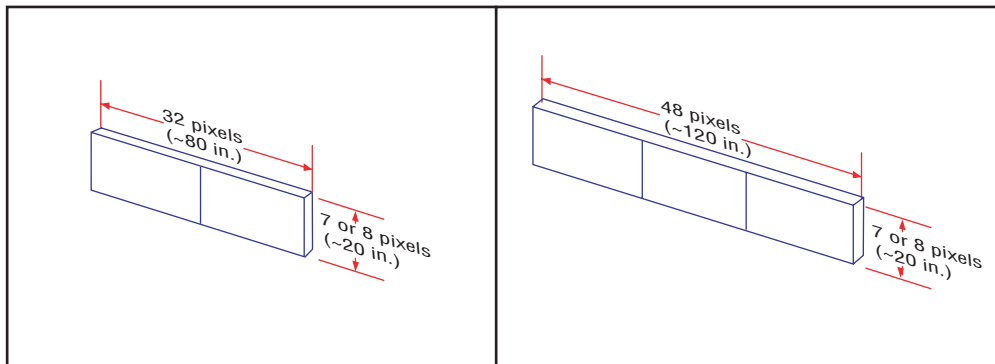


Figure 2. 64mm Sign modules

### 89mm Sign modules

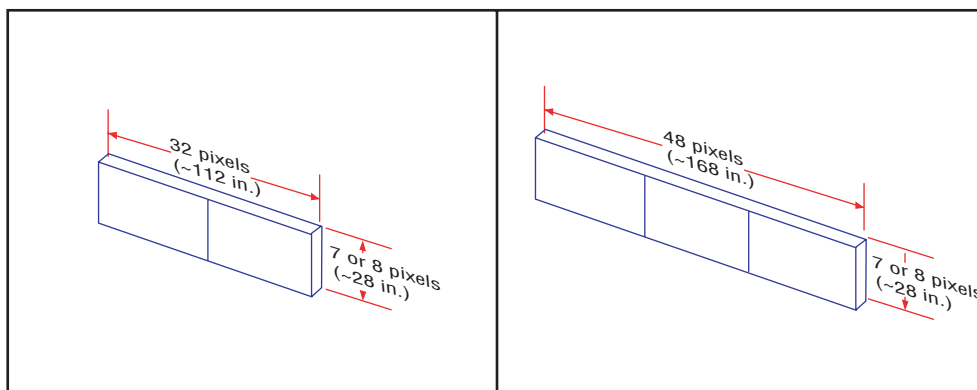


Figure 3. 89mm Sign modules

## Opening a sign door

**WARNING!** Hazardous voltage. Contact with high voltage may cause death or serious injury. The on/off power switch on the circuit breakers DO NOT turn off power to all lines in a sign. Remove power at the source.

**Notice:** Open sign doors slowly to prevent damage to internal components.

### → To open a sign door

1. Remove power from the sign at the source.
2. Locate the sign door that needs to be opened.

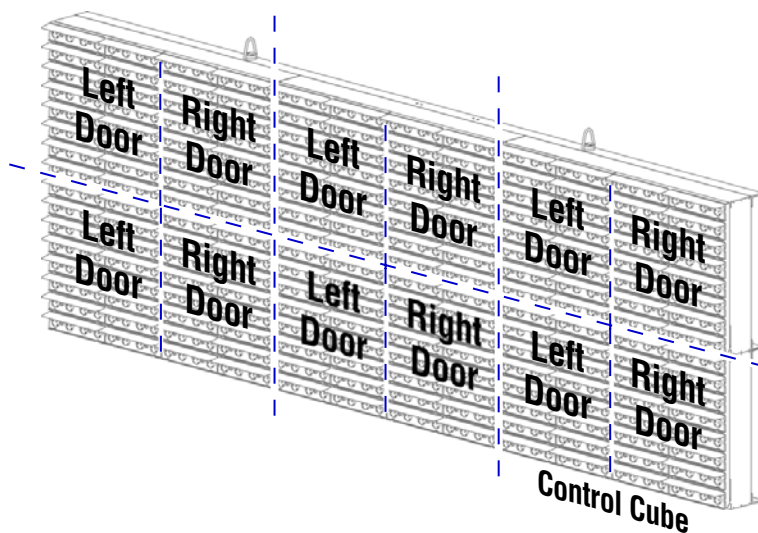


Figure 4. Each sign cube has two doors, a left and a right

3. Locate the two sign door locks.

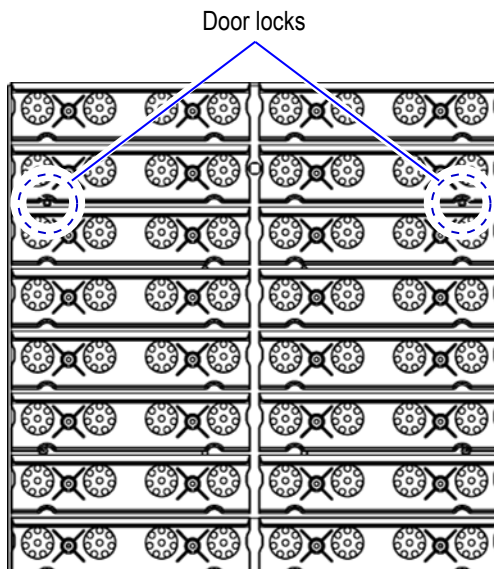
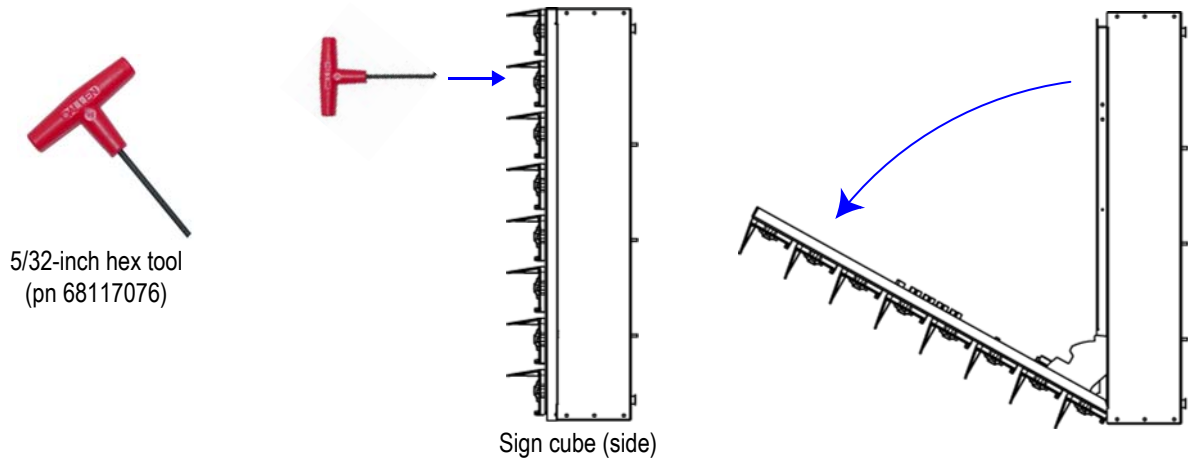


Figure 5. Door lock locations



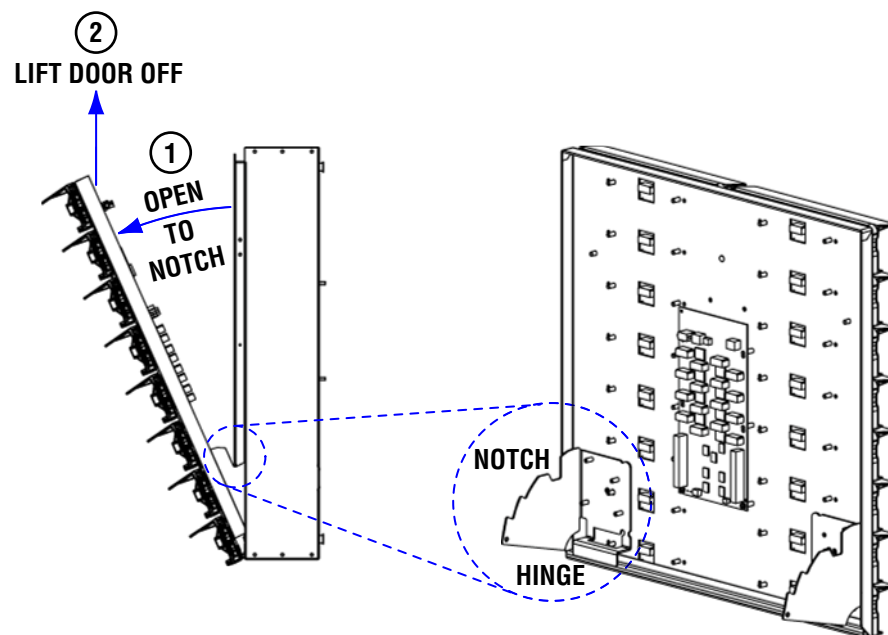
- Use a 5/32-inch hex tool to open both door locks and carefully pull back the sign door.



**Figure 6.** Using the hex tool to open a sign cube.



To completely remove a sign door, open the sign door until the “notch” is pointing straight up. Then lift the sign door up and remove it.



**Figure 7.** Lift the door up to remove it

# Top and front views

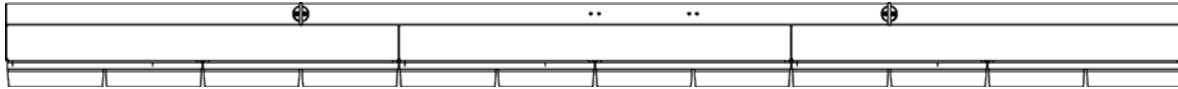


Figure 8. Top view of a 16x48 sign, other sign sizes are similar

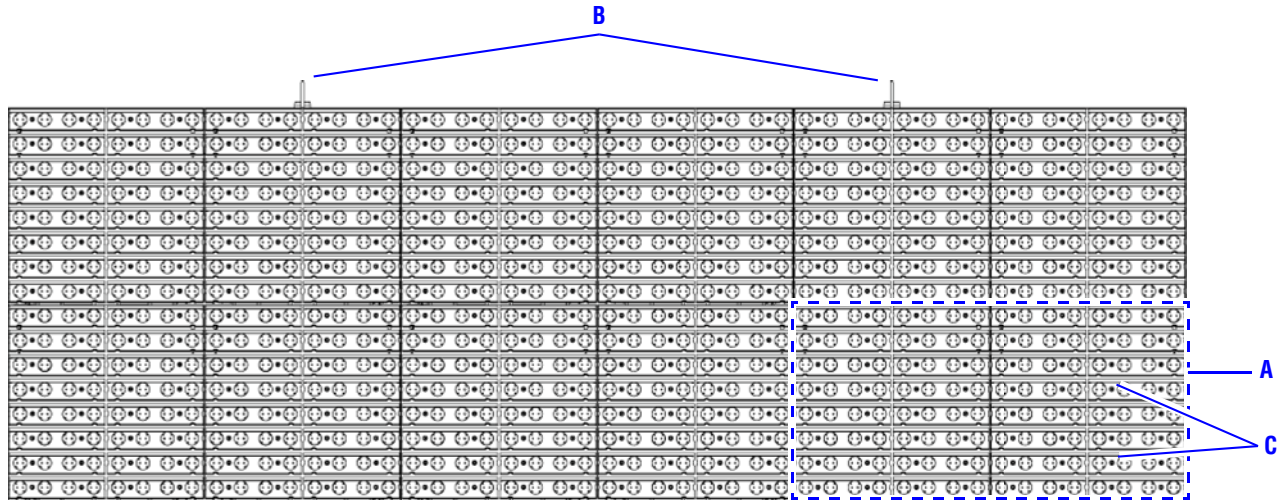
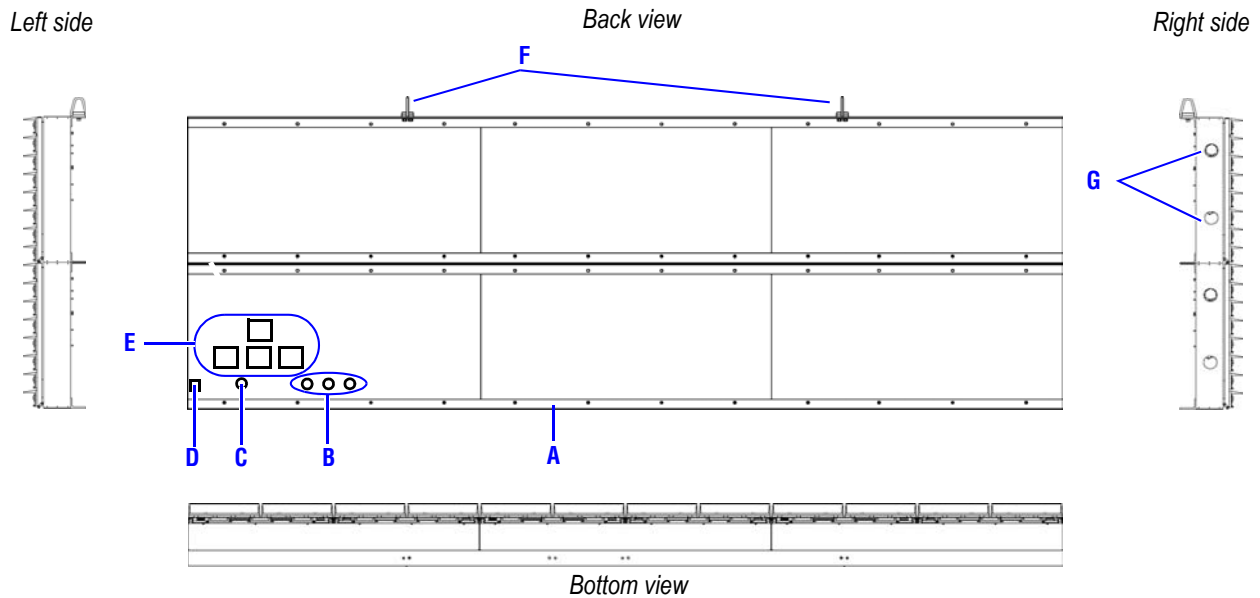


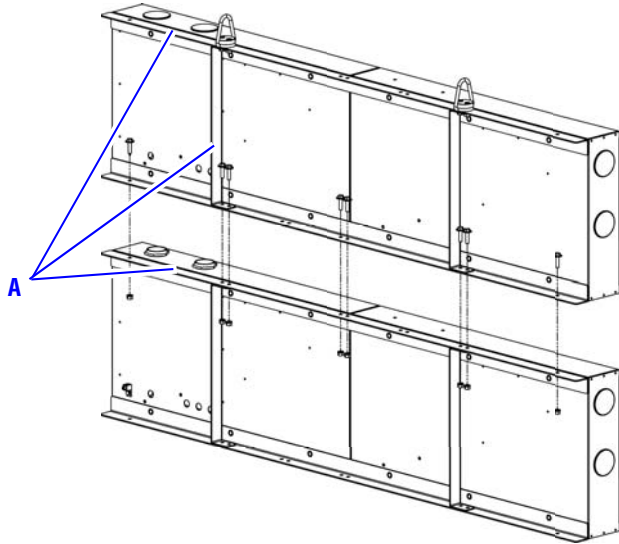
Figure 9. Front view of a 16x48 sign, other sign sizes are similar

Item	Name	Description
A	CUBE	Each cube has two sign doors, and each sign door has 14 or 16 display boards. <div style="text-align: right; margin-top: 10px;"> </div>
B	LIFTING HARDWARE	Used to lift the sign during installation. This hardware must be removed after the sign is installed or corrosion to the sign may occur.
C	LIGHT SENSOR HOLE	Allows light into the light sensor. This opening must be kept free of obstructions. The location of the light sensor varies depending on the sign pitch. Shown in "Figure 9" are the two possible locations.

# Back, side, and bottom views



**Figure 10.** Back, side, and bottom views of a 16x48 sign, other sign sizes are similar

Item	Name	Description
<b>A</b>	SECTION SUB-STRUCTURE	Each section is attached to a support frame: 
<b>B</b>	COMMUNICATIONS CONDUIT HOLES	7/8-inch conduit holes for 1/2-inch conduit communication wires. (Remove hole plugs prior to use.)
<b>C</b>	POWER CONDUIT HOLE	7/8-inch holes for 1/2-inch conduit for power wires. (Remove hole plugs prior to use.)
<b>D</b>	GROUND LUG	Grounding point for earth ground.
<b>E</b>	EQUIPMENT LABELS	Sign label, section compliance label, and master or slave label; containing information about the sign. (See "Equipment identification" on page 14.)
<b>F</b>	LIFTING HOOKS	Used to lift sign sections during installation. This hardware must be removed after the sign is installed or corrosion to the sign may occur.
<b>G</b>	WIRE ENTRY HOLES	Used to route power and communication wires between shippable sign sections.

## Internal view

RoadStar signs are comprised of two types of cubes, ordinary cubes and control cubes.

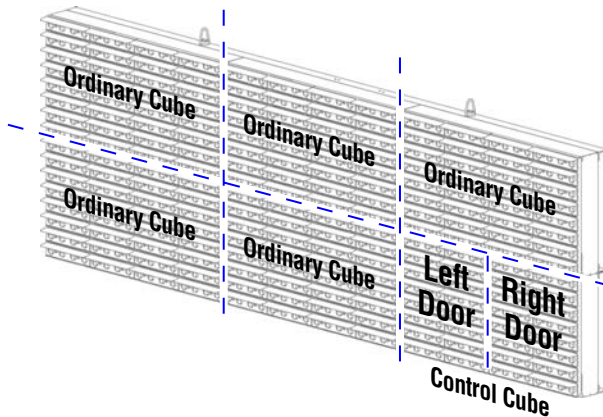


Figure 11. Cubes on a 16x48 sign, other sign sizes are similar

### Ordinary cube

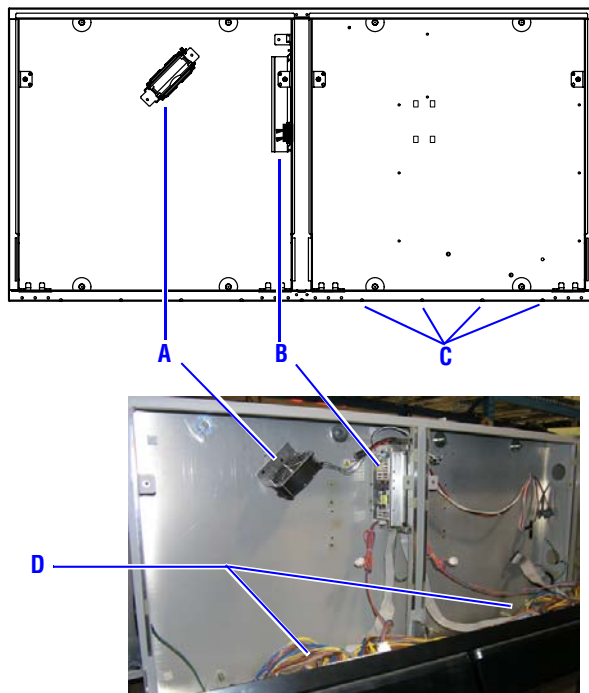
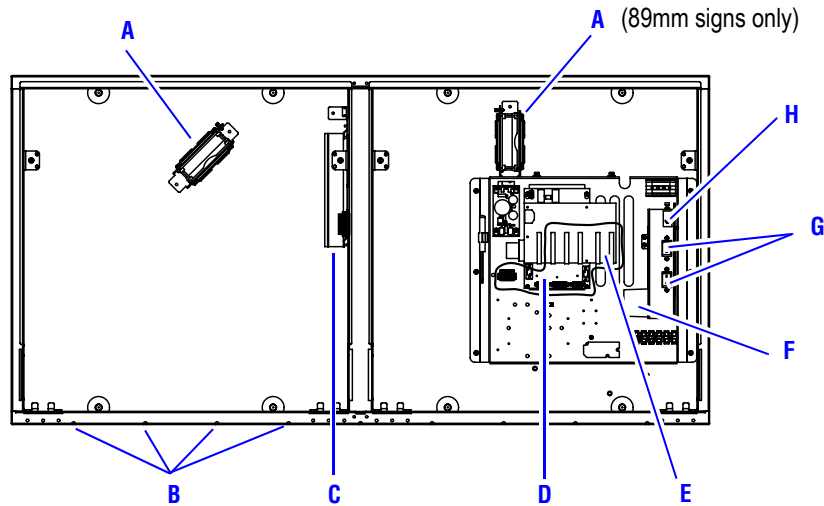


Figure 12. There are one or more ordinary cubes in a sign

Item	Name	Description
A	FAN	Lowers the sign's internal temperature by circulating air in the sign.
B	POWER SUPPLY	Supplies 15VDC power to each LED driver board.
C	DRAIN HOLES	Allows condensation to drain out of the sign.
D	LED DRIVER BOARDS (BACKS)	Each LED driver board supplies the turbo signal to up to 16 LED display boards. The turbo signal turns each LED on or off. There are two LED driver boards in each sign cube.

## Control cube



**Figure 13.** There is one control cube in a sign located at the bottom right side

Item	Name	Description
A	FAN	Lowers the sign's internal temperature by circulating air in the sign.
B	POWER SUPPLY	Supplies 15VDC power to each LED driver board.
C	DRAIN HOLES	Allows condensation to drain out of the sign.
D	CONTROLLER BOARD	Translates incoming RS232 (modem, wireless, etc.) or RS485 data and relays this data to the entire sign using the LED driver boards. There is only one controller board in a sign.
E	TURBO INTERFACE BOARD	Supplies the turbo signal to each line in the sign. The turbo signal turns the LEDs on and off.
F	SURGE SUPPRESSOR	Protects the sign against transient surge events. There is one surge suppressor at each power entry in a sign.
G	CIRCUIT BREAKERS	Line voltage to each line of the sign is routed through the circuit breaker. One circuit breaker is used for each line of the sign.
H	FAN TEST SWITCH	Used to verify fan operation.

# Equipment identification

## Sign label

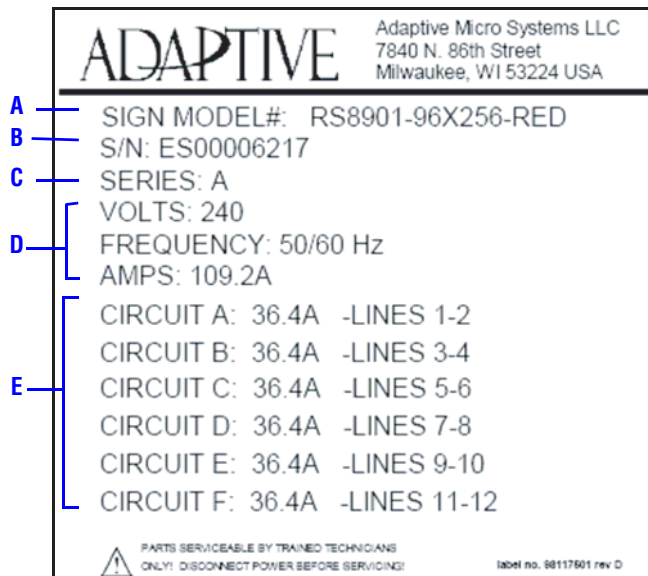


Figure 14. This label is located on the back of and inside of the control cube

Item	Name	Description
A	SIGN MODEL NUMBER	Identification number for the assembled sign: <b>RS 89 01-24x160-RED</b> <ul style="list-style-type: none"> <li>LED lamp color:                             <ul style="list-style-type: none"> <li>• RED = red</li> <li>• AMB = amber</li> </ul> </li> <li>Number of pixel columns</li> <li>Number of pixel rows</li> <li>LED Viewability:                             <ul style="list-style-type: none"> <li>• 01 = 30°/70°</li> </ul> </li> <li>LED Pitch (mm):                             <ul style="list-style-type: none"> <li>• 64mm</li> <li>• 89mm</li> </ul> </li> <li>AlphaEclipse RoadStar (product name)</li> </ul>
B	SERIAL NUMBER	Unique identification number for the sign.
C	SERIES LETTER	Revision level of sign.
D	ELECTRICAL INFORMATION	Input voltage, frequency, and total amperage of sign.
E	CIRCUIT	Circuits and amperage used on this sign.

**Section compliance label**

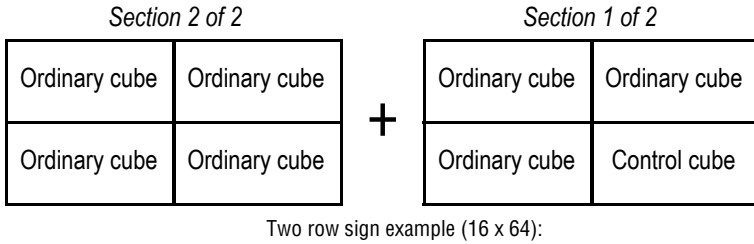
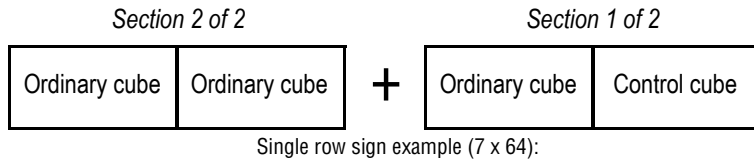


**Figure 15.**Section compliance labels are located on the back of each sign section

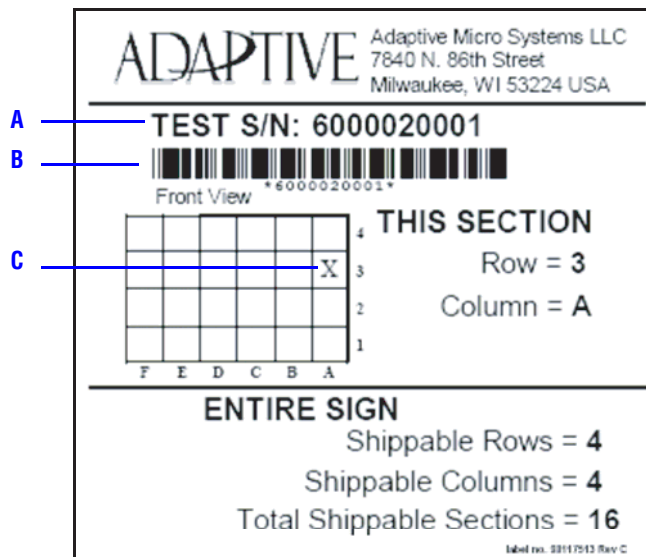
Item	Name	Description
A	SECTION MODEL NUMBER	Identification number for the section: <b>1175-89 01 MX 07 32 RED</b> <ul style="list-style-type: none"> <li>LED lamp color:                             <ul style="list-style-type: none"> <li>• RED = red</li> <li>• AMB = amber</li> </ul> </li> <li>Number of pixel columns</li> <li>Number of pixel rows</li> <li>Section configuration                             <ul style="list-style-type: none"> <li>• MX = Main Section</li> <li>• SX = Secondary Section</li> <li>• MS = Main Secondary</li> <li>• MP = Main Power</li> </ul> </li> <li>Angle of visibility:                             <ul style="list-style-type: none"> <li>• 01 = 30°/70°</li> </ul> </li> <li>LED Pitch (mm):                             <ul style="list-style-type: none"> <li>• 64 = 64mm</li> <li>• 89 = 89mm</li> </ul> </li> <li>AlphaEclipse RoadStar</li> </ul>
B	SERIES LETTER	Revision level of sign.
C	DATE OF MANUFACTURE	Month, day, and year the sign was made.
D	ETL LOGO	ETL Compliance mark.

### Section identifier label

Large signs may be shipped in multiple parts or “sections.” Each section contains 2 or 3 sign cubes. Section identifier labels are located on the back of each sign section near the section compliance label. See “Section compliance label” on page 15.



**Figure 16.** Sign sections are identified by numbers incrementing from the right to the left sections of a sign



**Figure 17.** Sample section identifier label

Item	Name	Description
A	Serial number	Unique identification number for the sign (see sign label), plus a letter suffix that indicates assembly location of sign.
B	Serial number barcode	The serial number expressed as a barcode.
C	Section number	Indicates assembly location of section.



## Temperature protection

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### Sign shutdown

- When the temperature of the sign's controller board is equal to or greater than 203°F (95°C), the message "OT" will appear in the upper left of the sign's display area. All other LEDs will remain off.
- When the temperature of the sign's controller board is less than 194°F (90°C), then the sign will resume normal operation.

### Fans

When the temperature inside a sign exceeds 100°F (38°C), the fans will start. When the temperature falls below 80°F (27°C), the fans will stop.

### Temperature logging

The sign keeps tracks of its internal temperature and this log can be read using AlphaNET Diagnostic software.

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# Mechanical installation

## Overview

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The AlphaEclipse RoadStar signs uses a modular design allowing for several different sign sizes and configurations.

The sign must be installed onto a super-structure designed to withstand live loads and comply with all national and local codes. Live loads include loading from wind and seismic events. Because every sign installation is unique, there is no single procedure for mounting AlphaEclipse RoadStar signs.

**WARNING! Sign sections must be supported (affixed to a super-structure able to withstand live loads and comply with all national and local codes) prior to opening the doors, otherwise the sign may tip causing serious injury.**

**Notice:** Sign parts could sustain damage if the doors are opened and the sign is not fully off the ground. Failure to comply voids the warranty.

## Structures defined

**Sub-structure:** The formed steel angle on the back of each sign section (top and bottom). Supplied with the sign.

**Super-structure:** Customer or installer supplied structure to which the sign sections are mounted. Super-structures must be approved by a qualified structural engineer.

**ID sign:** Company name and/or logo sign supplied by the customer or installer. ID signs used in conjunction with Adaptive signs must not interfere with Adaptive's ventilation, electrical, and mounting requirements.

## Super-structure design

The design of a sign's support structure depends on a number of factors: mounting methods, building codes, foundation, sign size, sign weight, sign height, wind loading, and seismic loading.

All installations, super-structure designs, and connections must be approved by a qualified structural engineer. Call Adaptive Micro Systems at 1-800-558-7022 for contact information for structural engineering consultants.

## Sign mounting guidelines and requirements

**Notice:** Do not use sign's ground-lugs for grounding installation equipment such as welding equipment or the warranty will be void.

Only the sign's sub-structure may be welded. Welding any other part of the sign will void the warranty.

The method used to mount signs varies greatly from location to location. The installer must ensure the installation complies with all national and local codes.

A qualified structural engineer must review the structure and attachment points to the super-structure. The back of the sign uses a 2"x 2" x 0.13" (64mm pitch signs) or 2"x 3" x 0.13" (89mm pitch signs) formed steel angle. These angles assist in mounting the sign.

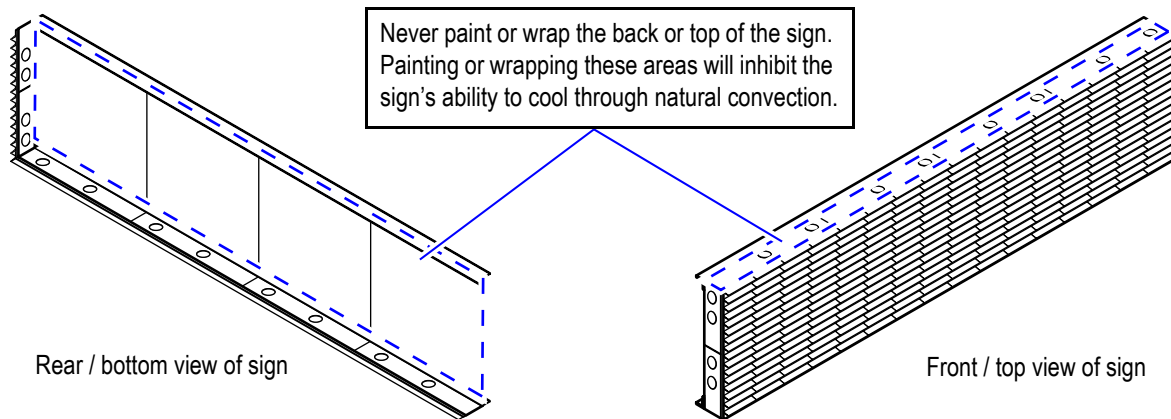
**Sign installers must comply with the following Adaptive requirements or the sign warranty will be void:**

- Any ID sign, fascia trim, or structure used above the sign **must** either have flashing or extend past the face of the sign.
- **DO NOT** allow water to pool / gather underneath or on top of the sign.
- **DO NOT** allow water from an above ID sign, fascia trim, flashing, or any other structure to drip directly onto the sign's door seams.
- **DO NOT** seal the sign in way that restricts hot air from escaping the inside of the sign.
- Comply with all sign ventilation and clearance requirements. Refer to "Ventilation requirements" on page 21 for details.

## Sign painting or wrapping

**Notice:** Painting or vinyl wrapping the top and/or the back of the sign will void the warranty.

The sides and bottom of the sign may be painted or vinyl wrapped without affecting the product warranty. When painting the sign, follow the paint manufacturer's instructions for surface preparation of mill finish aluminum.



**Figure 18.** Painting or wrapping the sign.

## Ventilation requirements

**Notice:** Inadequate ventilation will ultimately result in component failure that may not be covered under warranty.

Signs require obstruction-free space for adequate air ventilation between solid mounting surfaces and the top, bottom, and sides of the sign. This is required for all wall, monument, and pole mounted signs. Refer to “Wall mounting” on page 22, “Monument Mounting” on page 23, or “Pole mounting” on page 25 for more details.

Always take into consideration other neighboring heat sources such as backlit signs, lighting sources, etc. and add additional ventilation when needed.

**Note:** Shading the back of the sign will enhance thermal performance.

### Adaptive Explains

#### How does the sign cool itself?

Although the sign cases are completely enclosed with no forced air ventilation, the sign does rely on natural convection to cool. The top and back of the sign case uses these surfaces as heat sinks to cool the inside cabinet temperatures. An internal mixing fan helps cooling by mixing the air inside bringing it all to a more uniform temperature or isothermal.

The sign is enclosed to keep out contaminants which adversely affects the sign from corrosion and dirt build-up. The dirt build-up or corrosion deters the sign’s ability to cool.

#### What is natural convection?

Natural convection is a type of heat transportation. In natural convection, air surrounding a heat source receives heat, becomes less dense and rises. The surrounding, cooler air then moves to replace it. This cooler air is then heated and the process continues, forming a convection current.

**For every installation provide adequate ventilation or the sign warranty may be void:**

- **DO NOT** mount air ducts (vents) directly to the sign or sign’s sub-structure.
- **DO NOT** modify the sign or sign’s sub-structure for ventilation purposes (see Figure 24 on page 27). The super-structure design **MUST** incorporate adequate ventilation.
- Provide 7-square inches of ventilation for every 1-square foot of sign. For signs under 7-feet in height use 3.5-square inches for every 1-square foot of sign. Ventilation is defined as obstruction-free space.
- Ventilation air ducts **MUST** be installed evenly spaced around the perimeter of the sign (top, bottom, and sides). Evenly spaced air ducts help maintain a consistent air flow around the sign.
- Air duct size **MUST** be a minimum of 7-square inches (equivalent to a 3-inch round air duct).
- If the sides of the sign are covered (enclosed), install a minimum of two air ducts in each side covering.
- Provide a minimum clearance of 1-inch above and below the sign.
- Provide a minimum clearance of 6-inches behind the sign.

### Wall mounting

Signs require obstruction-free space for adequate air ventilation between solid mounting surfaces and the top, bottom, and sides of the sign.

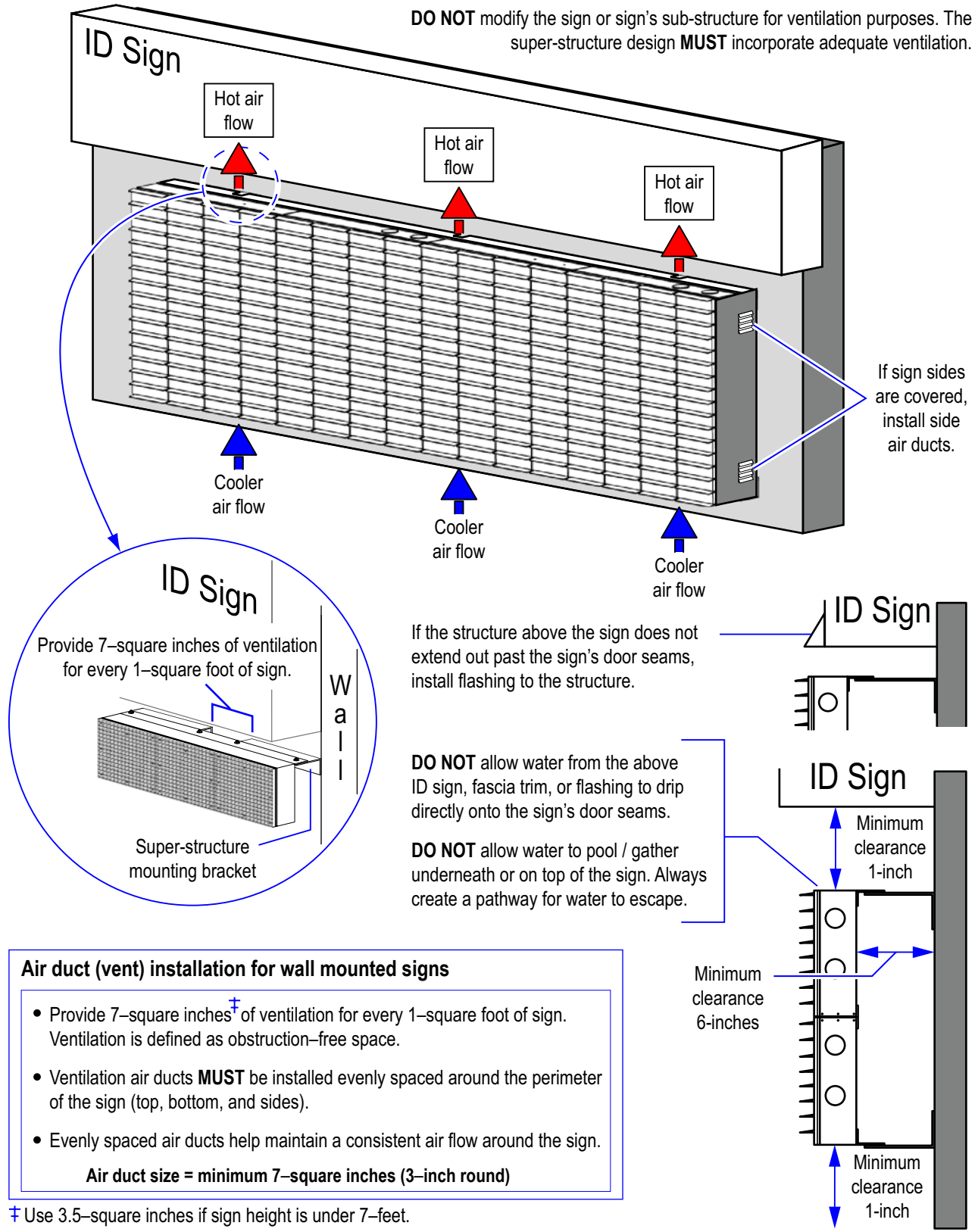
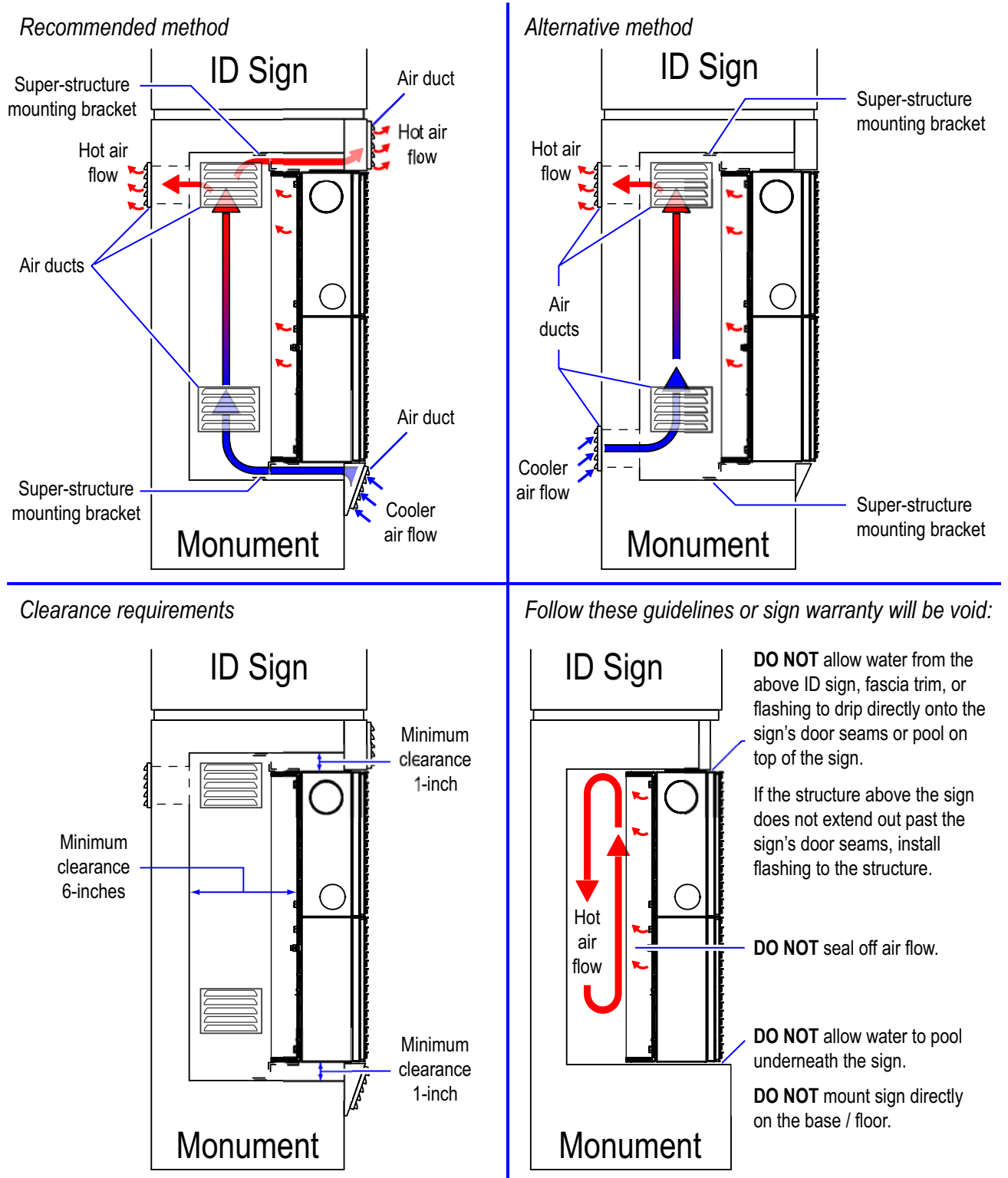


Figure 19. Ventilation requirements around a wall mounted sign

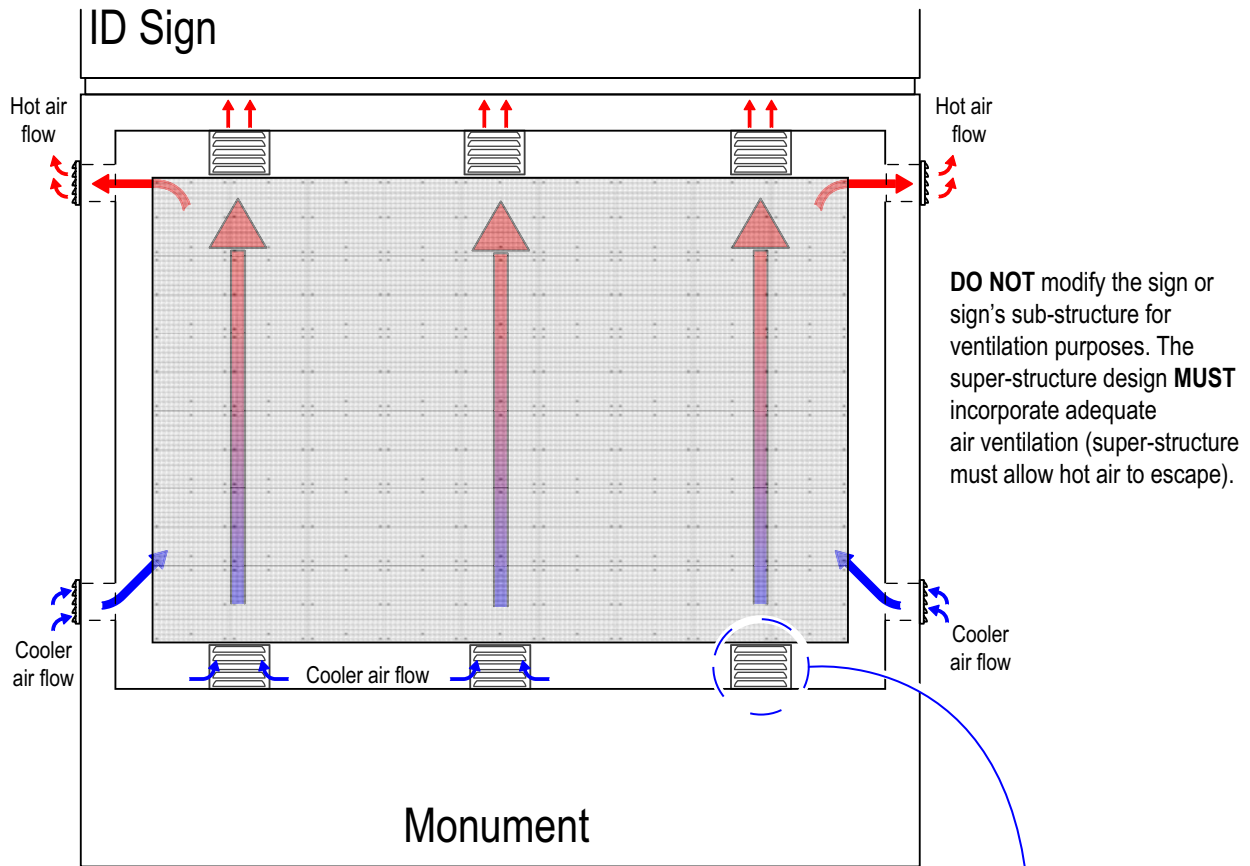
## Monument Mounting

If there is an obstruction on the outside of the sign (as in a monument-style installation), care must be taken to assure the sign is able to cool. Air ducts **must** be used in the monument to allow air to flow behind the sign. When monument mounting a RoadStar sign, use air ducts to help hot air escape. For back to back sign configurations refer to “Ventilation diagram for back-to-back sign configurations” on page 67 for details.

**Note:** Adaptive recommends the installation of fans to force hot air out of the air ducts.



**Figure 20.** Use air ducts when monument mounting.

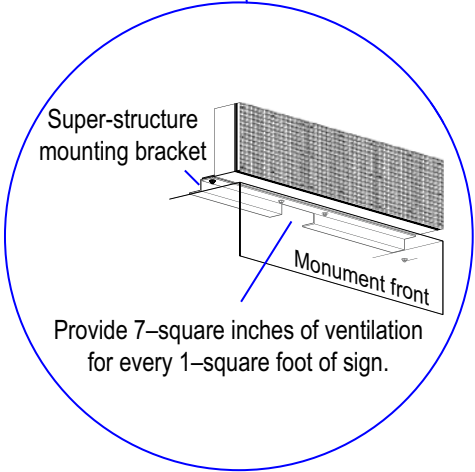


**Air duct (vent) installation for monument mounted signs**

- Provide 7-square inches<sup>‡</sup> of ventilation for every 1-square foot of sign. Ventilation is defined as obstruction-free space.
- Ventilation air ducts **MUST** be installed evenly spaced around the perimeter of the sign (top, bottom, and sides).
- Evenly spaced air ducts help maintain a consistent air flow around the sign.

**Air duct size = minimum 7-square inches (3-inch round)**

<sup>‡</sup> Use 3.5-square inches if sign height is under 7-feet.



**Figure 21.** Monument air duct placement.



### Pole mounting

Signs require obstruction-free space for adequate air ventilation between solid mounting surfaces and the top, bottom, and sides of the sign.

#### Air duct (vent) installation for pole mounted signs

- Provide 7–square inches<sup>†</sup> of ventilation for every 1–square foot of sign. Ventilation is defined as obstruction–free space.
- Ventilation air ducts **MUST** be installed evenly spaced around the perimeter of the sign (top, bottom, and sides).
- Evenly spaced air ducts help maintain a consistent air flow around the sign.

**Air duct size = minimum 7–square inches (3–inch round)**

<sup>†</sup> Use 3.5–square inches if sign height is under 7–feet.

**DO NOT** wrap or paint sign top (super-structure must allow hot air to escape).

**DO NOT** allow water to pool / gather underneath or on top of the sign. Always create a pathway for water to escape.

**DO NOT** modify the sign or sign’s sub-structure for ventilation purposes.

If the structure above the sign does not extend out past the sign’s door seams, install flashing to the structure.

Provide a minimum clearance of 1–inch above and below the sign and 6–inches behind the sign.

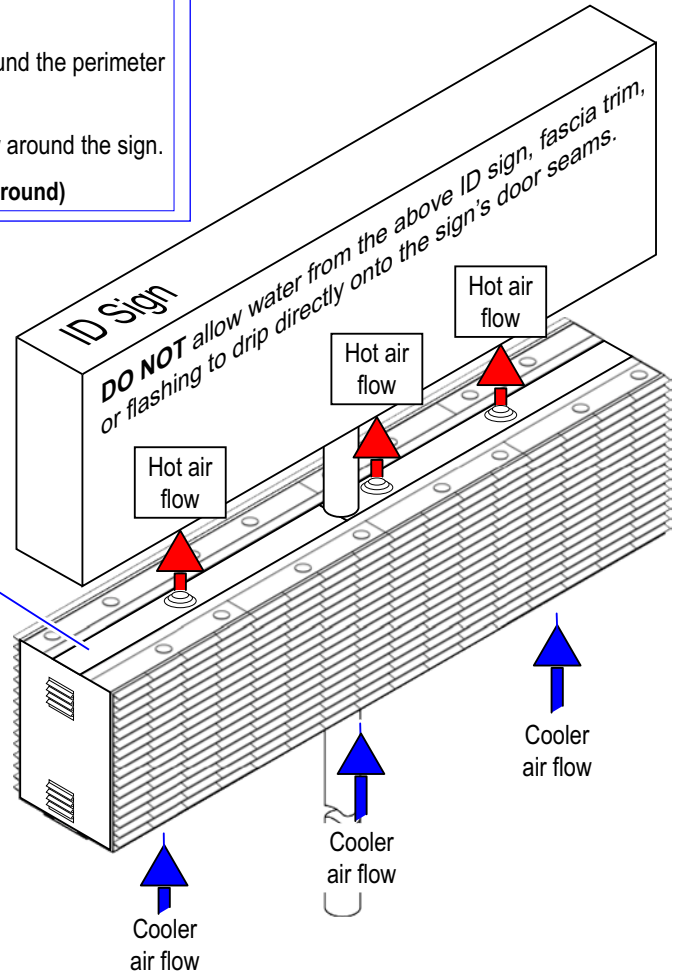


Figure 22. Pole mounting a RoadStar sign.

## Lifting the sign

**WARNING!** Crush hazard. Improperly assembling or lifting a sign can create a crush hazard.

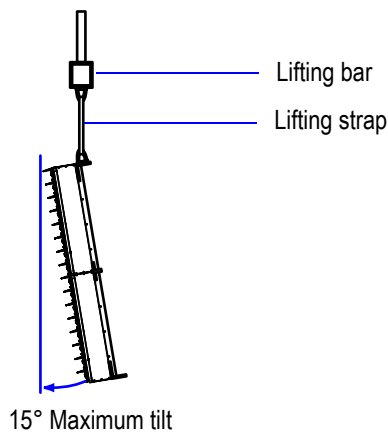
Do NOT use eyebolts to lift an assembled sign. They are designed only to lift a sign section from its shipping crate.

Lift the sign evenly and level, with no more than a 15 degree tilt.

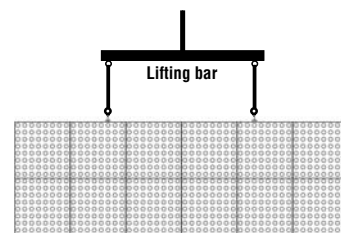
Use a lifting bar adjusted to the width of the lifting hardware on the sign to raise the shippable section. After mounting the sign sections, remove the lifting hardware or corrosion to the sign may occur. **Failure to follow these instructions will void the warranty.**

1. Lift the sign section up to the super-structure.
2. Position the sign section on the super-structure.

### 15° Maximum lifting tilt



### PREFERRED METHOD



### ALTERNATE METHOD

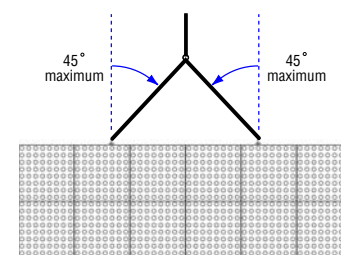


Figure 23. Sign section lifting methods

## Mounting the sign to the super-structure

The methods used to mount a sign to a super-structure vary greatly. It is the installer's responsibility to ensure that the installation complies with all national and local codes.

**Notice:** Drill holes as needed in the sign's sub-structure for fasteners. Only drill holes into the sign when field upgrade instructions or Adaptive's Technical Service Department explicitly states to do so. Drilling holes in the sign under any other circumstance will void the sign's warranty.

When drilling holes or welding the sign's sub-structure, follow these guidelines or the warranty will be void:

- **DO NOT** drill additional conduit holes through the controller plate in the control case.
- **DO NOT** drill additional conduit holes along the bottom of the case, because water may pool there.
- **DO NOT** use the sign's ground-lugs for grounding installation equipment such as welding equipment.
- **DO NOT** weld any part of the sign except for the sign's sub-structure.

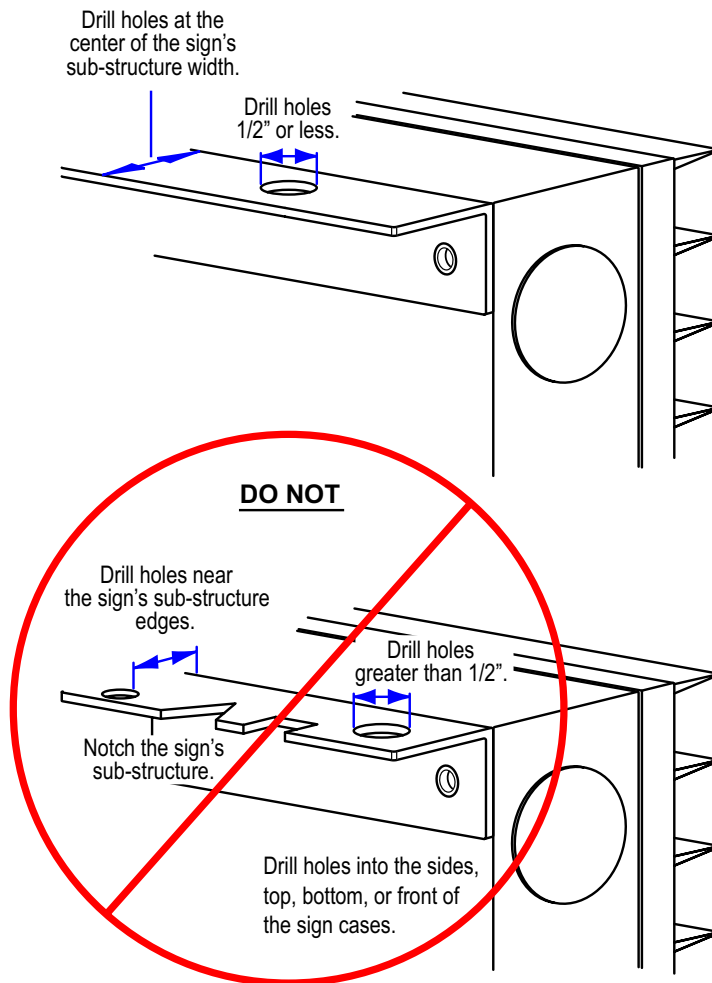


Figure 24. Drilling guidelines

**Notice:** Dissimilar metals must be isolated to avoid galvanic corrosion.

Any area on the sign's frame from which paint is removed during mounting, must be recoated with paint that is UL recognized to standard UL-1332, category DTOV2. Failure to repaint the area will result in accelerated corrosion of the sign's structure. Adaptive Micro Systems is not responsible for any failure in the sign's structure because of accelerated corrosion. Failure to comply will void the sign's warranty.

### Mounting signs with multiple sections

Large AlphaEclipse RoadStar signs are shipped from the factory in multiple sections. Mount sign sections to the super-structure starting with the bottom right section, section 1. Refer to the identifier label (See “Section identifier label” on page 16 for label information) on each section to determine the proper location. Large signs with multiple sections are mounted horizontally first, and vertically second. For signs with more than one vertical section, use the supplied bolts to vertically connect the sections.

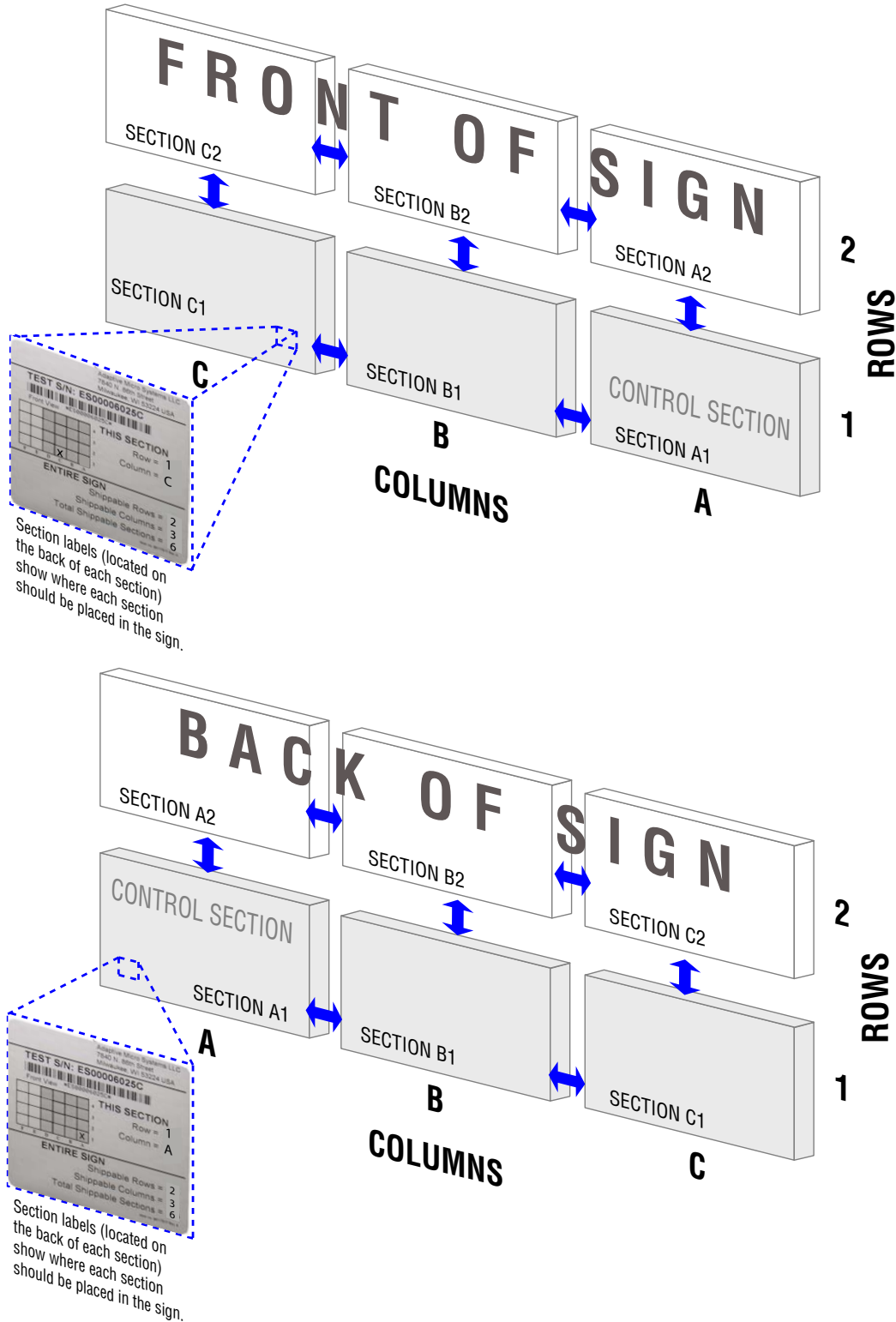


Figure 25. Multiple section sign assembly

## Wiring signs with multiple sections

**Notice:** Failure to install any of the vertical or horizontal grommets between sign sections can allow water entry into the sign and will void the warranty.



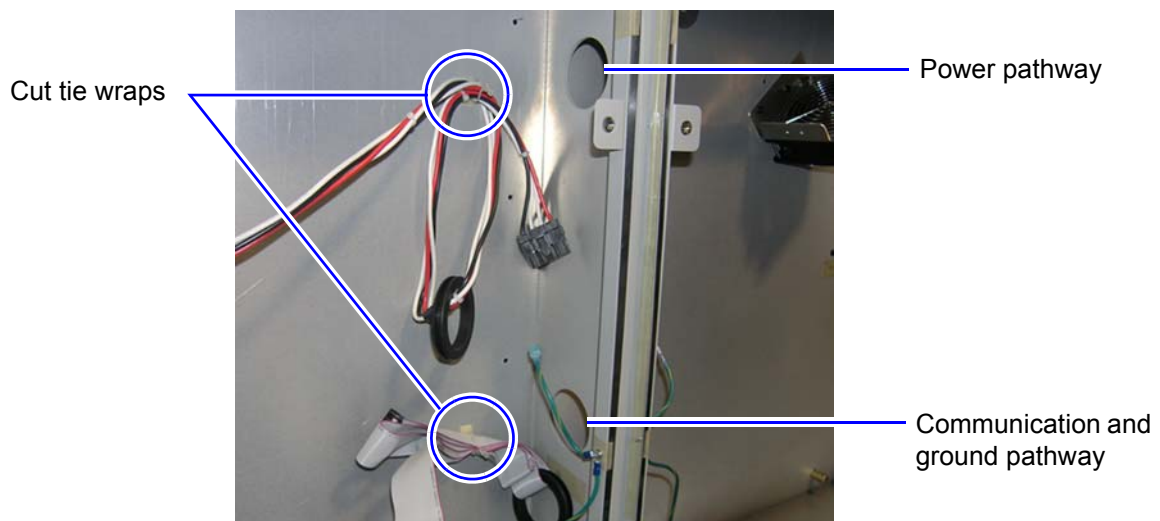
**Figure 26.** Multiple sign section wiring (24x160 RoadStar sign shown).

Wire horizontal sign sections starting from the right cube of the left-most sign section into the left cube of the sign section on the right. Wire vertical sign sections starting from the top right cube of the bottom-most sign section up into the bottom right cube of the sign section above. Horizontal and vertical wiring procedures are the same.

**Note:** Connect power horizontally **NOT** vertically, see “Running power to the sign” on page 34 for details.

### ➔ To wire signs with multiple sections

1. Open the sign sections.
2. Remove the stickers covering the wire pathway openings between shippable sign sections.
3. Remove tie wraps.

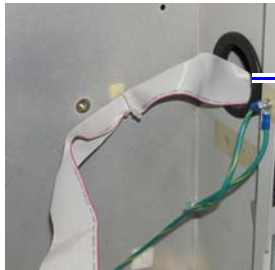


**Figure 27.** Power and communication cables.

- 4. Insert grommets and route cables through the appropriate opening.



Installed grommet for power pathway.



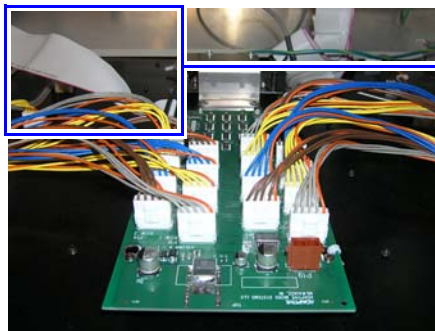
Installed grommet for communication and ground wire pathway.

**Figure 28.**Grommets installed in sign section pathway openings.

- 5. Connect cable ends to the designated component.



Power cable and power supply connection.



Communication cable connects to the differential converter board on the back of the driver board.



Ground wire connection between sign sections.

**Figure 29.**Cable connection between sign sections.

- 6. Repeat steps 1-6 between all shippable sections.

---

# Electrical installation

**WARNING!** Hazardous voltage. Contact with high voltage may cause death or serious injury. The power switches on the circuit breaker **DO NOT** turn off power to all lines in a sign. Remove power at the source.

**Notice:** The following electrical installation requirements must be followed or the sign warranty will be voided.

Electrical installation must only be attempted by a qualified electrician. Electrical connection must comply with all applicable national and local codes.

---

## Requirements for electrical installation

The electrical installation of signs varies greatly. The following bullet points are requirements. **It is the installer's responsibility to ensure that the installation complies with all national and local codes.**

- All power wiring **must** be from circuit breaker-protected lines.
- **DO NOT** connect the sign to a GFI-protected circuit.
- A two-pole disconnect device **must** be installed in the building wiring for each branch circuit supplying the sign.
- The sign **must** be properly grounded according to the applicable national and local electrical codes (for example, NEC Article 250 and 600, and IEEE 1100-1999).
- All electrical conduit connections **must** be watertight.
- Use minimum 80° C copper wire only.
- Torque terminals to a minimum of 7 in/lbs and a maximum of 10 in/lbs.
- **DO NOT** drill additional conduit holes.
- **DO NOT** route power and communication wires out of the cube door and around the side of the sign; the wires will be damaged when the door is closed.
- Separate conduits **must** be used for signal wires (for example, RS232, RS485) and for power wires. However, fiber optic wire may be run in the same conduit with power wires.

## Power requirements

Adequate power **must** be run to the sign in accordance with the “Technical specifications” on page 51.

- The sign is configured for **one of two power configurations only**; 115VAC single-phase or 230VAC single-phase power. The sign is **NOT** configured to run off a 3-phase power source.
- The sign **must** be run on it's own dedicated circuit to ensure proper operation. This is particularly important when the sign is installed in a structure containing ballasts for fluorescent lamps. They **must** have their own circuit. Not complying with this requirement can lead to intermittent sign operation or malfunction.
  - **Do NOT** run power to the sign and the ballasts off the same circuit.
  - When ballasts are used in the vicinity of the Adaptive sign, it is recommended that they be of the electronic low harmonic type to further reduce the risk of any interference with the sign.
  - Wire gauge and breakers **must** be sized or verified in accordance with Adaptive's input power specifications, the National Electric Code, and applicable local codes. **Under-sizing the wire gauge or breaker size can lead to intermittent sign operation or malfunction.**
- Some sign sizes require more than one circuit (power entry) according to Adaptive's “Technical specifications” on page 51.

### Adaptive Explains

#### Is it necessary to run *two* conduits to a sign?

It is not always necessary. Two conduits are only necessary when communication wire, like RS485 wire, is run to a sign from a computer or from another sign. In these cases, one conduit would contain the sign's power wires and the other conduit the communication wires.

If power and communication wires are put in the same conduit, communication wires will pick up electrical interference from the power wires. For example, when a live power cord is placed next to a stereo speaker wire, the interference from this cord may cause the speaker to hum. In the case of a sign, this same effect could disrupt messages sent to the display.

However, fiber optic cable and power wires can share the same conduit because fiber optic cable is immune to electrical interference.



## Earth-grounding RoadStar signs

Properly grounding each sign is necessary because it is an essential means of preventing shock, shock hazards, and potential fire hazards.

**WARNING!** Failure to properly ground the sign could result in elevated voltage from lightning entering the sign seeking a path to earth. The high voltage can result in electric shock, fires, and the destruction of the sign from lightning.

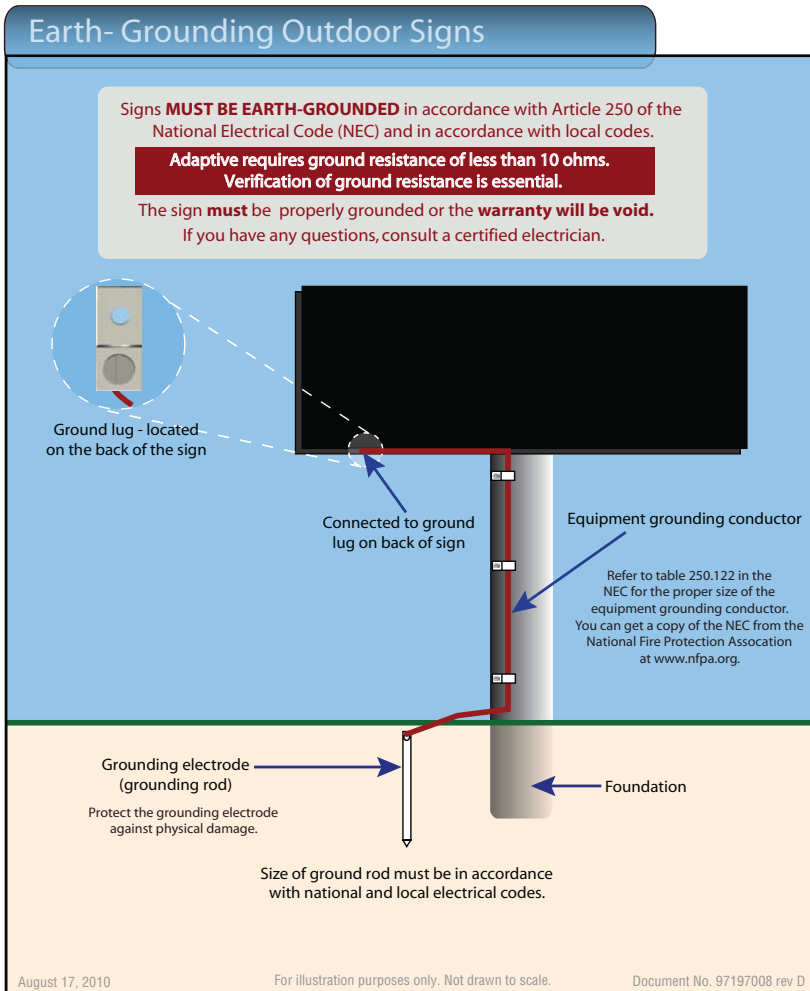


Figure 30. Earth-grounding illustration

## Lightning strike protection

A sign bonded to an earth ground has a means of dissipating the high voltage and current from a lightning strike. The resistance of the grounding electrode **must** be as low as possible. However, damage can still occur to a sign's electronic equipment from lightning voltage transients.

Though some surge protection is incorporated into a sign, to protect a sign from high-voltage lightning transients, **surge protectors need to be installed in accordance with NEC Articles 280 and 285** and local codes.

The following guidelines must be followed or the warranty will be void:

- Signs **must** be grounded in accordance with Article 250 of the National Electrical Code and in accordance with applicable local codes.
- **Do not** terminate the ground on metal poles or buildings. The metal will corrode resulting in deteriorated grounding properties. Additionally, metal poles or buildings are often mounted on material that does not provide an effective ground.

Adaptive also recommends the following guidelines:

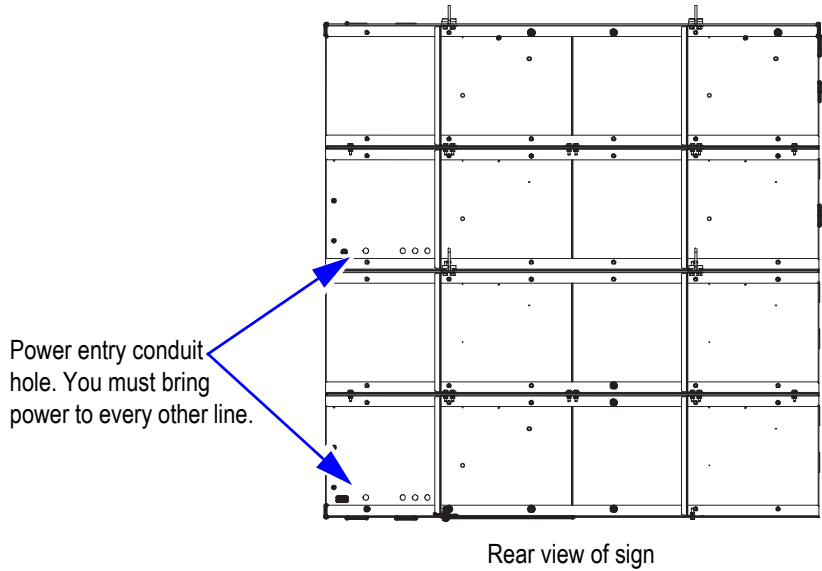
- Use copper-clad ground rods as the grounding electrode because they provide effective grounding for an indefinite period of time.
- Depending on the local soil conditions and codes, more than one ground rod may need to be installed.
- Since moisture becomes more stable at greater distances below the earth's surface, when possible, install the ground rod so that eight feet extend below the frost line to lessen the deviation in the system's resistance.
- Verify the grounding electrode conductor is securely attached at both ends.

# Running power to the sign

➔ **To run power to the sign:**

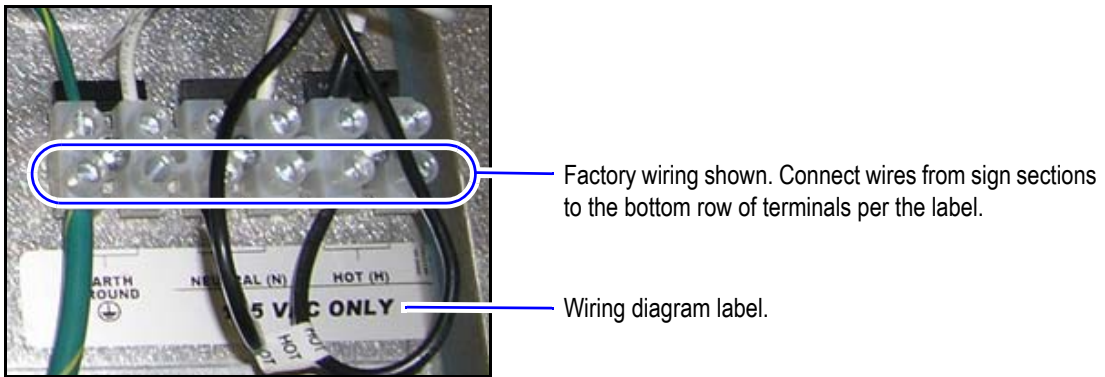
1. Run power to the sign using weather-tight conduit.

**Note:** Every other line in the sign requires a separate power input.



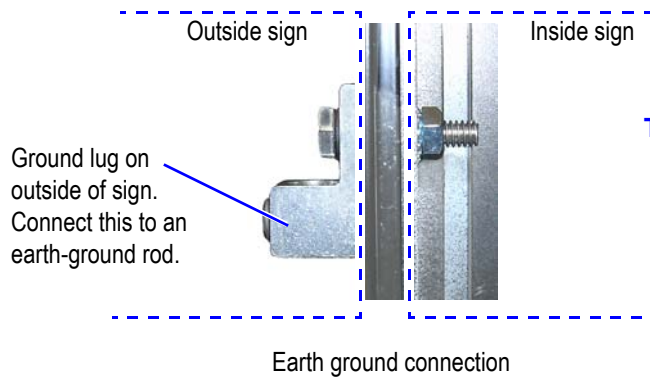
**Figure 31.**Bring power to every other line in the sign

2. Connect each power circuit to the appropriate wireway power terminal on the controller plate as shown on the terminal wiring diagram label.



**Figure 32.**Wireway power terminal wiring on the controller plate

3. Grounding is required at each power entry point. Connect a minimum of one grounding lug to an earth-ground rod.



**Tip:** The ground lug is located on the back of the controller section. See “Back, side, and bottom views” on page 11. for the location of the ground lug.

**Figure 33.**Ground lug.

4. Repeat steps 1 through 3 for each power entry.
5. Close the sign doors.

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## Temperature probe (optional)

When properly installed, the temperature probe will send a signal to the sign's controller board that indicates the accurate ambient temperature near the sign. The temperature probe with the standard cable (pn 71220401) can be mounted within 25 feet of the sign. This distance can be extended by changing the length and gauge of the cable. Contact Technical Support for more information.

### Temperature probe mounting requirements and guidelines

#### Requirements for temperature probe mounting

**Notice:** Do **NOT** mount the temperature probe along the top of the sign, on the sign, near sprinklers, or water fountains.

Failure to follow the temperature probe mounting requirements may cause intermittent or inaccurate operation and will not be covered by the warranty.

- Vents on the temperature probe **must** point downward. See Figure 34 on page 38 for proper orientation.
- Do **NOT** run the temperature probe cable in the same conduit as the sign's power wires.
- The conduit connection to the sign **must** be watertight.
- Do **NOT** mount temperature probe directly to the sign; however it is okay to mount to the sign's sub-structure.

## Guidelines for temperature probe mounting

Choose a mounting location that meets the following criteria, otherwise the temperature probe will record a false temperature reading:

- Mount the temperature probe on or near the sign's super-structure. Mount below the bottom of the sign, avoiding the intake of hot air emitting from the sign. Refer to "How does the sign cool itself?" on page 21 for details.
- Air movement is not restricted by nearby walls or other obstructions.
- Mounting background is light-colored and not dark-colored.
- Above vegetation and not above asphalt or blacktop.
- On the north side of a building to provide protection from the sun.
- Shield the probe from the effect of the direct sun, reflected heat, or any nearby sources of heat, such as chimneys, lamps, vents, or HVAC ducts.
- At least six feet off the ground, and at least one foot below the eave of a protected overhang so convection currents (rising hot air flow) are not trapped around the temperature probe. Also, make sure convection currents are not blocked by mounting plates.
- Only one temperature probe is required in a network of signs but it **must** be connected to the Master sign.

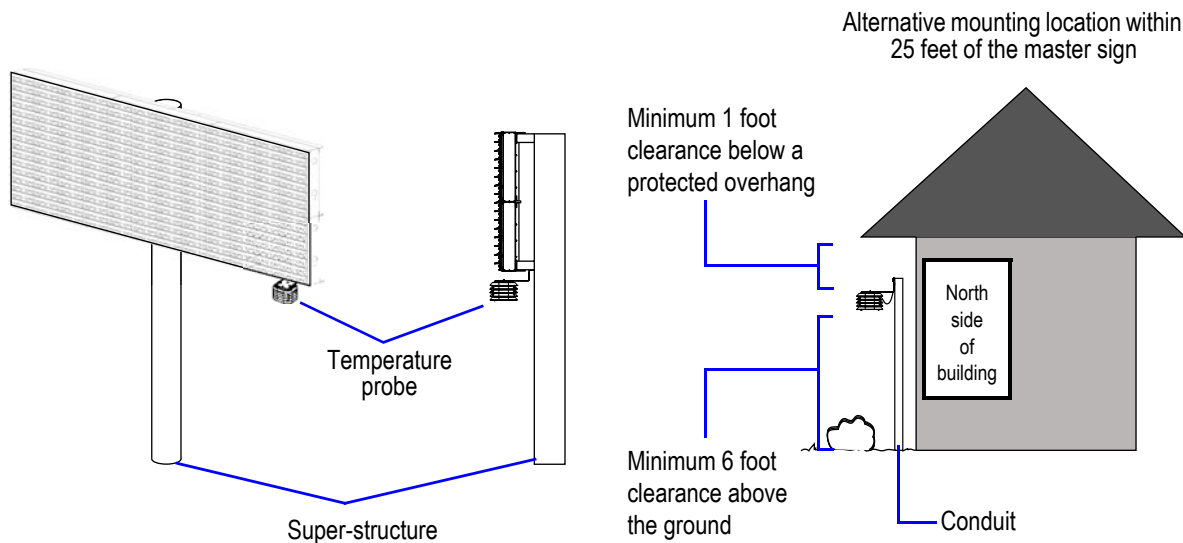


Figure 34. Possible temperature probe mounting locations.

➔ To install the temperature probe

**WARNING! Hazardous voltage! Contact with high voltage may cause death or serious injury. Always disconnect main power to unit prior to servicing.**

1. The temperature probe **must** be mounted with the vents pointing downward using the mounting holes OR the conduit holes on the bracket.

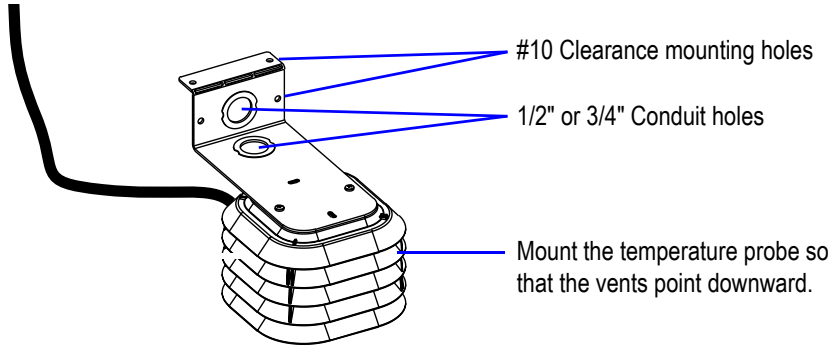


Figure 35. Temperature probe

2. Run the temperature probe cable through watertight conduit to the control cube. **The conduit connection to the sign must be watertight.**

**Notice:** To prevent interference, do **NOT** run the temperature probe cable in the same conduit as the sign's power wires. For more information, see "Is it necessary to run two conduits to a sign?" on page 32.

3. Connect the temperature probe cable to the wireway terminal block as shown below.

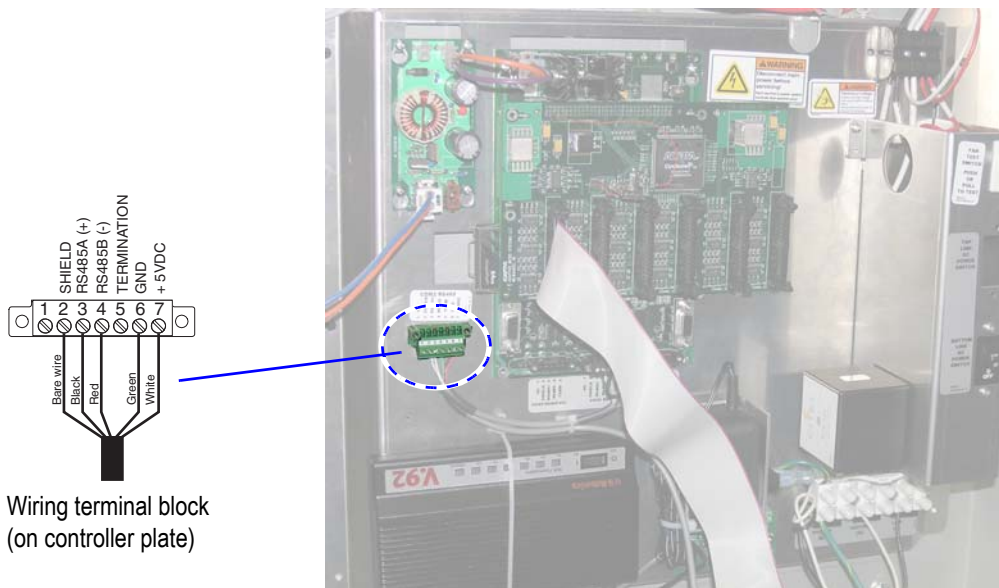


Figure 36. Temperature probe connection details

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# Networking signs

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## Master/Secondary Master and Master/Slave sign connections

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Two to four signs can be set up as either:

- **Master/Secondary Master (page 42)** — two to four signs that can display a different message. While the same message could be sent to both signs, the messages may not appear at exactly the same time.
- **Master/Slave signs (page 43)** — all these signs display the same message at the same time. In this setup, one sign is configured as the Master and all the others as Slave signs.

**Note:** When two or more signs are networked together, they must be properly terminated. See “RS485 Termination” on page 47 for more information.

### Adaptive Explains

#### Does it matter if signs are set up as Master/Secondary Master or Master/Slave?

The most important difference between Master/Secondary Master and Master/Slave signs is that Master/Slave signs *all display the same message at the exact same time*. On the other hand, signs configured as Master/Secondary Master allow you to display a *different* message on each of the signs.

#### How are signs set up to be Master/Secondary Master or Master/Slave?

Signs are configured at the factory.

#### How can I tell if a sign is a Master, a Secondary Master, or a Slave?

- Turn the sign off and then on again. The word “Master”, “Sec–Master” or “Slave” will appear in the sign’s startup messages.
- Use AlphaNET Diagnostics software to read this information from a sign.
- Read the label on the back of the sign that indicates how the sign is configured.

### Master/Secondary Master sign wiring

If your signs have the following labels, you have a master/secondary master sign configuration.

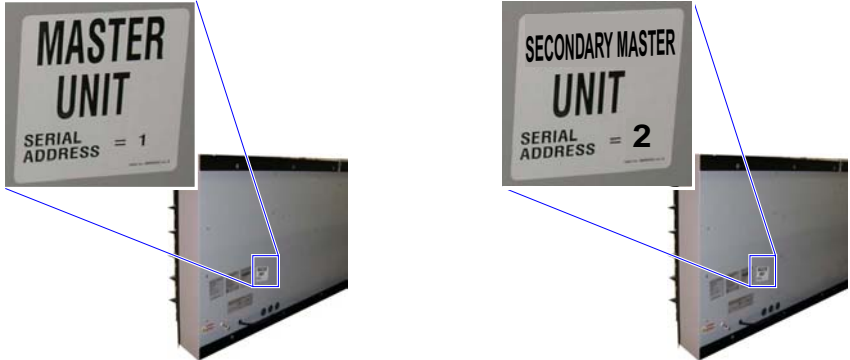


Figure 37. Master/Secondary Master labels

Wire the signs as shown in the diagram below:

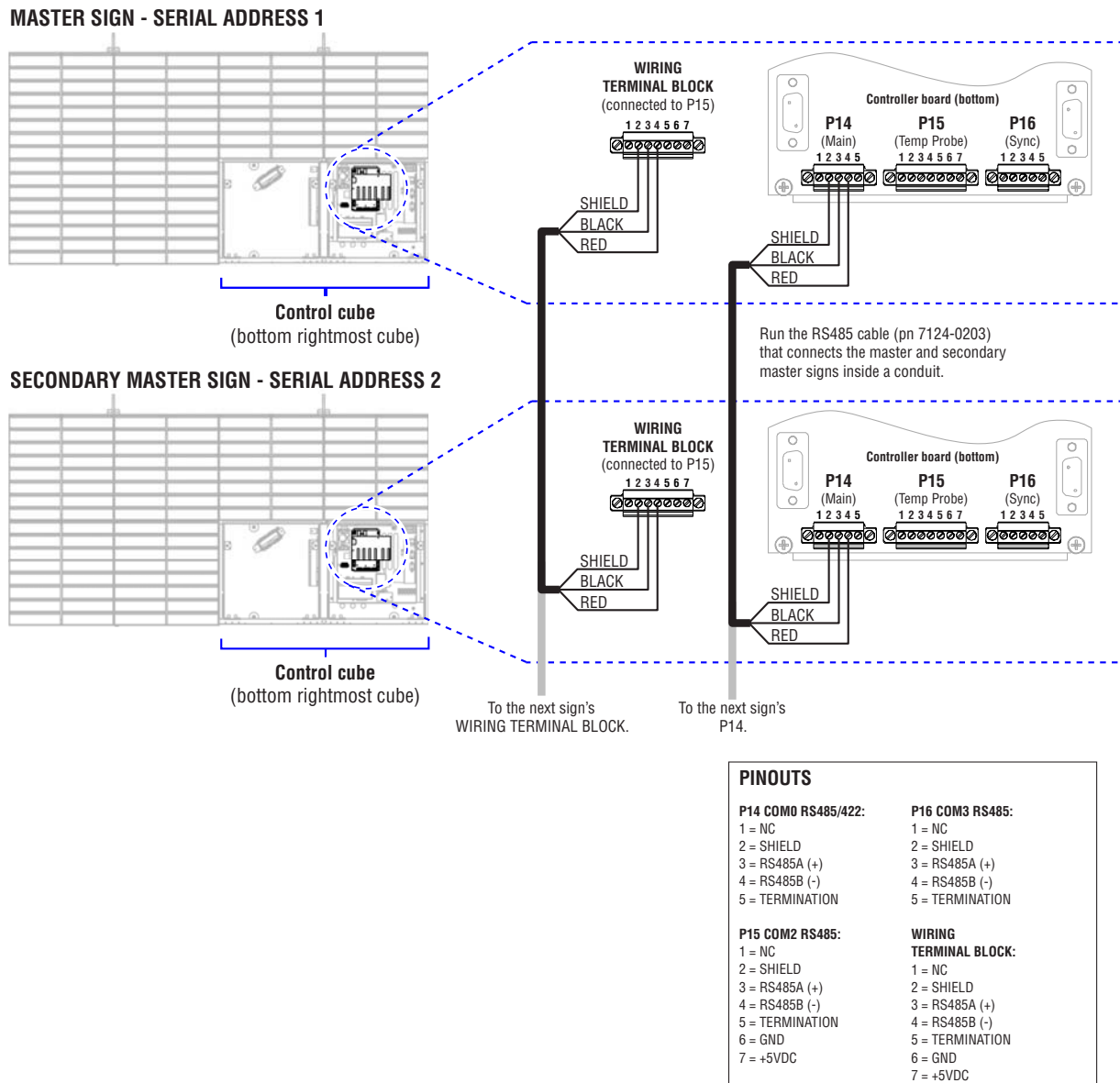


Figure 38. Master//Secondary Master wiring diagram

### Master/Slave sign wiring

If your signs have the following labels, you have a Master/Slave sign configuration.

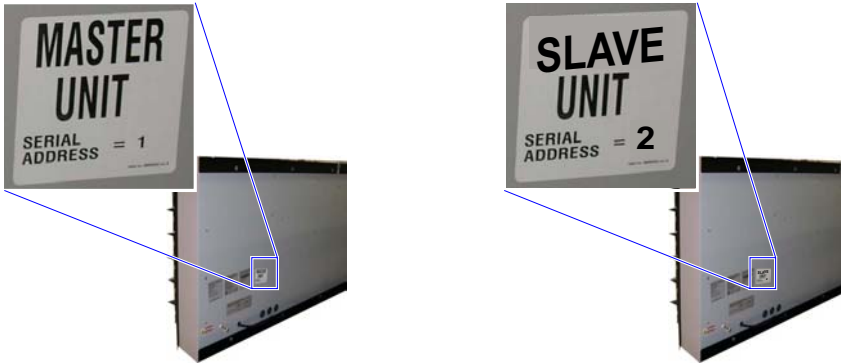


Figure 39. Master/Slave labels

Wire the signs as shown in the diagram below:

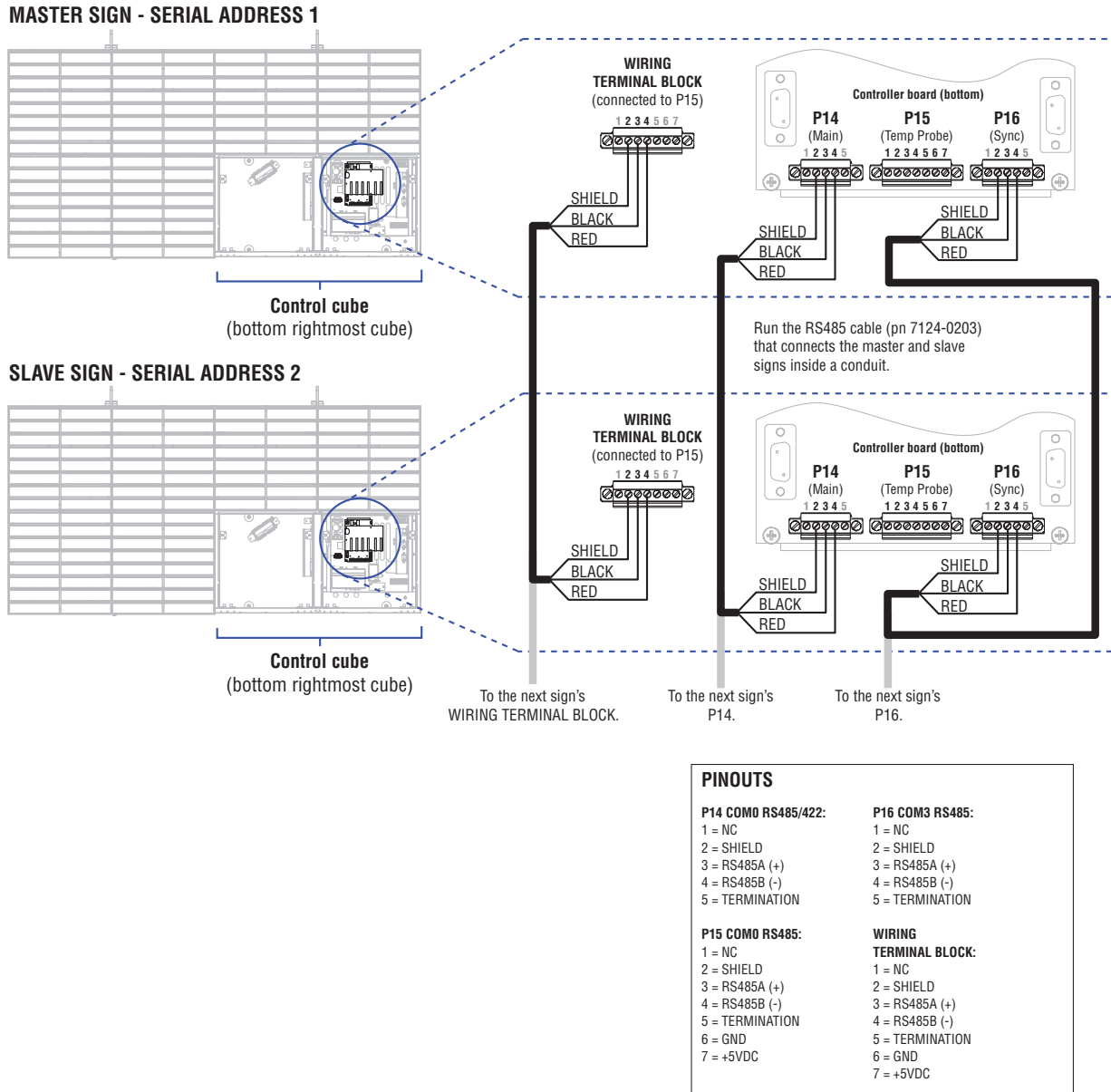


Figure 40. Master/Slave wiring diagram

# Installing the sign's connectivity





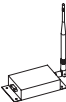
## Connectivity options

In order to display messages, a sign must be connected to a computer that is running AlphaNET software. This computer is referred to as the messaging computer.

There are a number of ways to connect the messaging computer to a sign and these options vary. Refer to the following table for information about your connection option.

**Note:** Messaging computer is not supplied by Adaptive Micro Systems.

### Connectivity options for AlphaNet

Options	Description	Page
 <p>Modem kit</p>	<p>By placing a modem inside a sign (factory installed) and attaching another transmitting modem to the messaging computer, messages are sent to a sign through ordinary phone lines.</p>	45
 <p>Converter Box III</p>	<p>Using RS485 wire (pn 71240203) routed through a weather tight-conduit, a sign can be wired to a computer up to 4000 feet away from the sign. Do not use ordinary wire, phone wire or CAT 5 wire in place of Adaptive's RS485 outdoor wire.</p>	45
 <p>Direct RS232 connection</p>	<p>A short (50 foot) connection typically used for sign troubleshooting or field testing.</p>	46
 <p>Fiber optic</p>	<p>Using a fiber optic mini-modem inside a sign (factory installed) and another fiber optic mini-modem connected to the messaging computer, a sign can be connected to a computer that could be up to 2 miles away from the sign. Fiber optic cable is immune to electrical interference so the cable can be placed in the same conduit as the power wires.</p>	46
 <p>Wireless transceiver</p>	<p>One wireless transceiver is placed inside the sign and another transceiver is connected to the messaging computer. Wireless transceivers can connect to a sign up to several miles away. (Actual distance can vary greatly depending on the local environment, obstructions, electrical interference, etc.)</p>	46

## AlphaNet connectivity option overview

The steps in this section explain how to install the various AlphaNet connectivity options. For more detailed diagrams of the connectivity options, see “AlphaNet connectivity diagrams” on page 69.

**IMPORTANT!** Regardless of how the sign will be connected to the messaging computer, AlphaNet software must be installed on the messaging computer. Refer to “How to install AlphaNET 3.0 software (pn 97088099)” for details.



### Modem connection

For more detailed diagrams of this connectivity option, see “120V Modem connection diagram” on page 70 and “230V Modem connection diagram” on page 71.

**Note:** Transmitting modem (pn 10889301) is not supplied with the option but can be purchased from Adaptive.

#### →To connect your sign using a Modem

1. Use the RS232 cable supplied with the transmitting modem to connect the modem to the messaging computer.
2. Use the RJ11 phone cord to connect the modem to the telephone service.

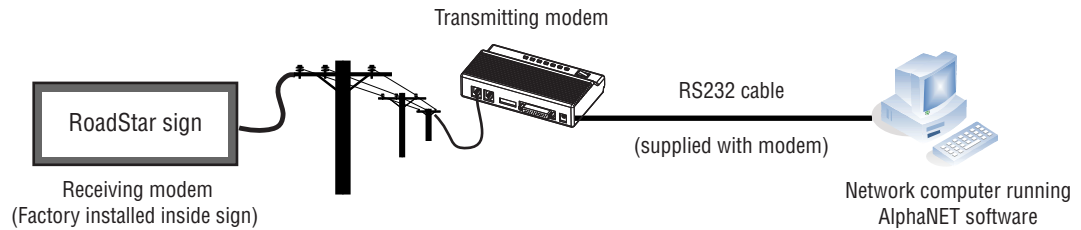


Figure 41. Modem connection overview



### Converter box III connection

For a more detailed diagram of this connectivity option, see “Converter box III connection diagram” on page 72.

#### →To connect your sign using a Converter Box

1. Connect the Converter Box to the Master Unit with outdoor RS485 wiring.
2. Connect the Converter Box to the messaging computer with RS232 serial cable.
3. Place the converter box next to the computer.

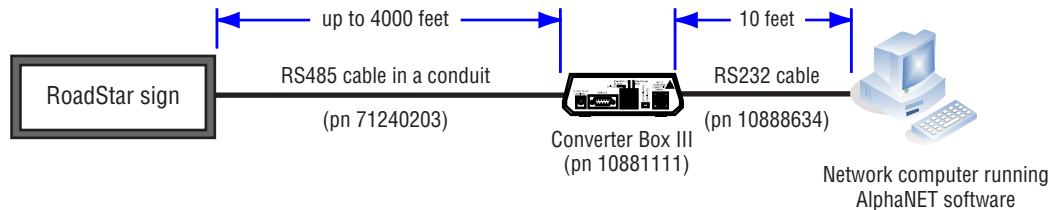


Figure 42. Converter box III connection overview



### RS232 direct connection

This connection is mainly used for troubleshooting the sign or field testing the sign while on-site.

#### ➔To connect your sign using a RS232 cable

1. Open the control cube and connect the RS232 cable to the Master Unit.
2. Connect the messaging computer to the same RS232 serial cable.

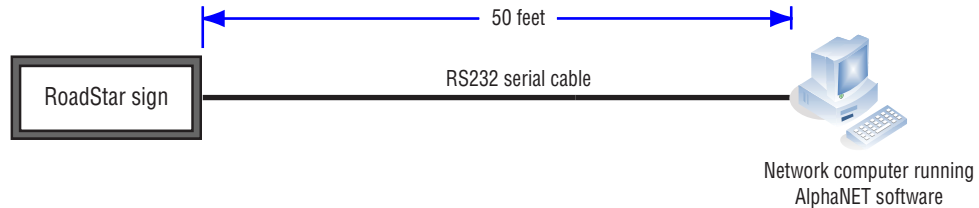


Figure 43. RS232 direct connection overview



### Fiber optic connection

For a more detailed diagram of this connectivity option, see “Fiber optic connection diagram” on page 73.

#### ➔To connect your sign using Fiber Optic

1. Use the DB9-to-DB9 cable to connect the messaging fiber optic modem to the computer.
2. Run fiber optic cables from the fiber optic modem in the sign to the fiber optic modem connected to the messaging computer.

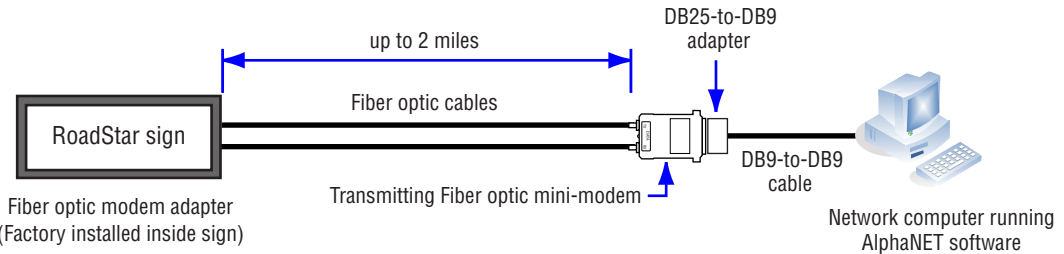


Figure 44. Fiber optic connection overview



### Wireless transceiver connection

For a more detailed diagram of this connectivity option, see “Wireless transceiver connection diagram” on page 74.

To connect your sign using a Wireless Transceiver (MaxStream Xtend 900 MHz), use the RS232 cable to connect the transmitting transceiver to the messaging computer.

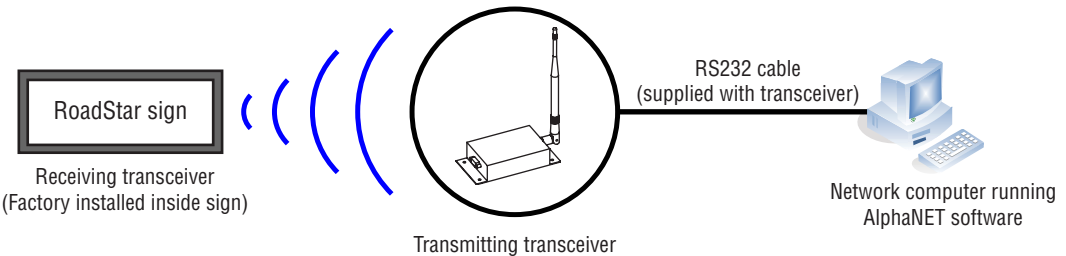


Figure 45. Wireless transceiver connection overview

# RS485 Termination

## What is RS485 termination?

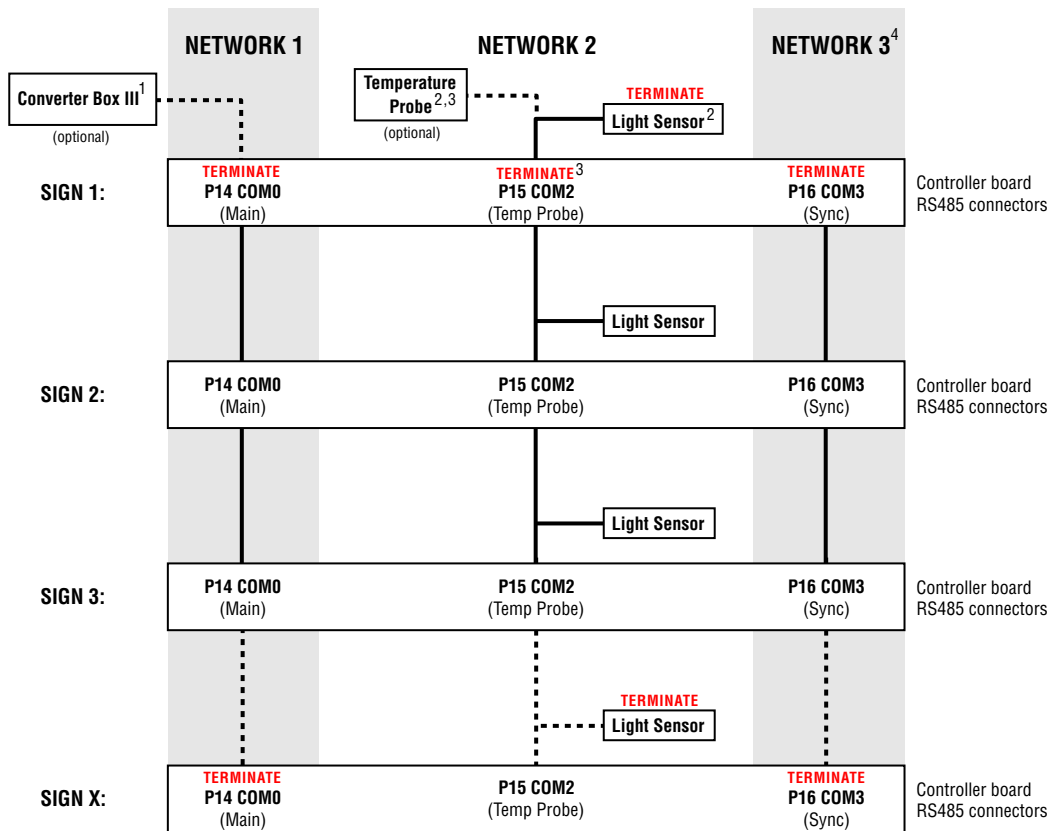
When signs are networked together, it is necessary to terminate each end of the network. This is necessary to make sure that the signs communicate with each other.

If signs are not correctly terminated, messages may not display properly.

## When is RS485 termination used?

Three RS485 networks are used to communicate with and between AlphaEclipse RoadStar signs. Each network must be terminated. As a general rule, the first and last sign should be terminated.

### AlphaEclipse RoadStar RS485 Termination



**NOTES:**

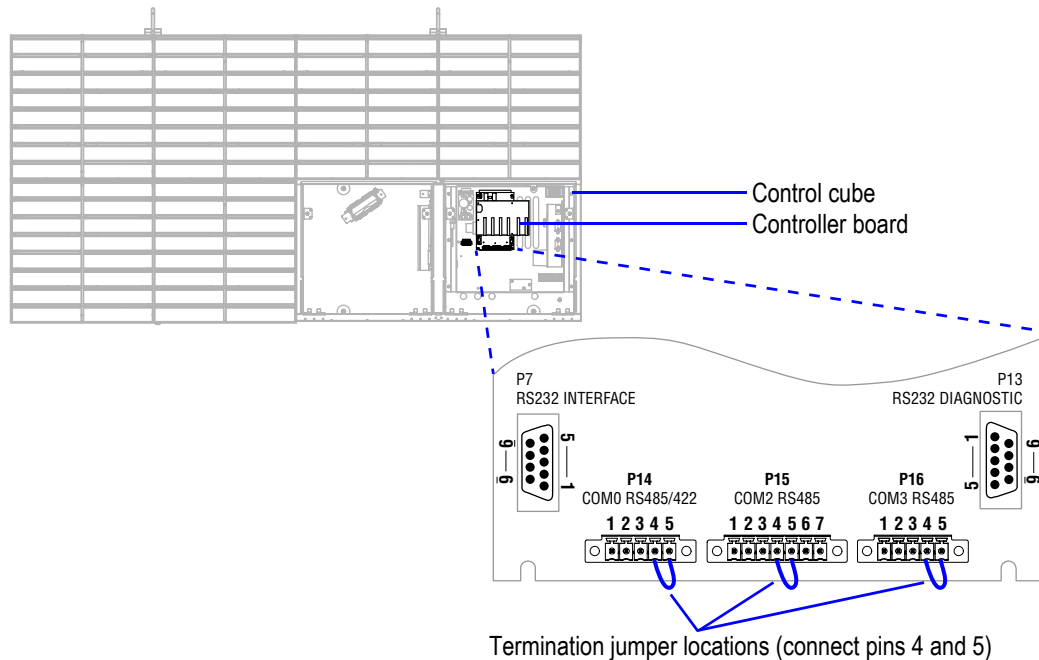
- <sup>1</sup> If a Converter Box III is connected to P14 in Sign 1 *and* 2 or more signs are networked together, then (1) remove termination from P14 in Sign 1 and (2) set switch on back of Converter Box III to terminated.
- <sup>2</sup> If a Temperature Probe is connected to a sign network of 2 or more signs, then remove termination from the Light Sensor in Sign 1.
- <sup>3</sup> If a Temperature Probe is connected to just a single sign, then remove termination from P15 in Sign 1.
- <sup>4</sup> NETWORK 3 (RS485 sync) is only used when signs are set up as Master/Slave (1 Master sign plus 1 or more Slave signs).

## Adding RS485 termination

**WARNING!** Hazardous voltage. Contact with high voltage may cause death or serious injury. The power switches on the circuit breaker DO NOT turn off power to all lines in a sign. Remove power at the source.

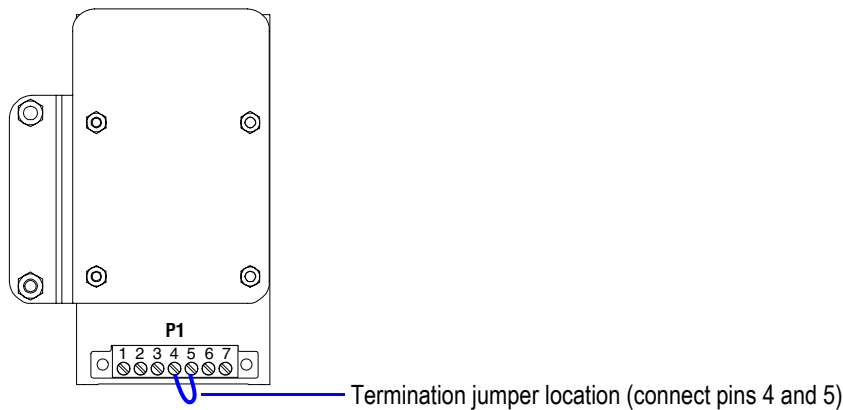
### ➔ To add RS485 termination

1. Remove power from the sign.
2. Locate the sign’s control cube (see “Internal view” on page 12).
3. Open the control cube.
4. Attach a wire jumper to the appropriate connector on the controller board.
  - Controller board - P14 COM0, P15 COM2, P16 COM3



**Figure 46.** Termination jumper locations on controller board

- Light Sensor board, which is located on control cube door - P1.



**Figure 47.** Light sensor jumper locations

5. Close and secure the control cube.
6. Apply power to the sign at the source.



## Removing RS485 termination

**WARNING!** Hazardous voltage. Contact with high voltage may cause death or serious injury. The power switches on the circuit breaker DO NOT turn off power to all lines in a sign. Remove power at the source.

### ➔ To remove RS485 termination

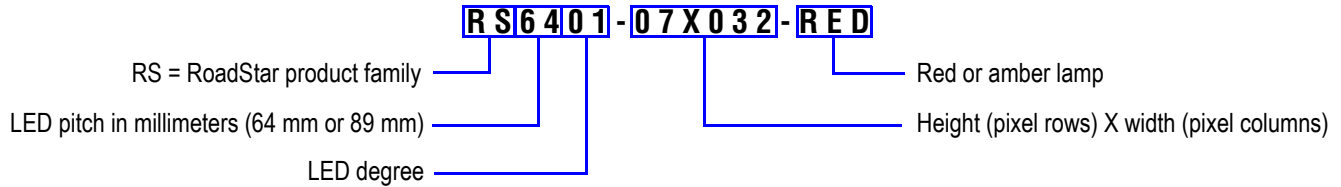
1. Remove power from the sign at the source.
2. Locate the sign's controller cube, see "Internal view" on page 12.
3. Open the control cube, see "Opening a sign door" on page 8.
4. Remove the wire jumper from the appropriate connector. See Figure 46, "Termination jumper locations on controller board" and Figure 47, "Light sensor jumper locations," on page 48 for details.
5. Close and secure the control cube.
6. Apply power to the sign at the source.

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# Appendix A

## Technical specifications

The most current specifications are maintained on Adaptive's website [www.adaptivedisplays.com](http://www.adaptivedisplays.com).



**Note:** All Dimensions are in inches and within ± 1/2".

**Note:** Weight ± 10%.

**Note:** Current Values represent the sign's maximum current ratings with all LEDs lit and fans on. These values are intended for sizing circuits. Typical current draws, which can be expected, are 25% to 65% of the maximum rating.

N/A - Indicates not applicable to this sign size.

SIGN SECTION MODEL NUMBER	SIGN WEIGHT (lbs)	Width	Height	INPUT CURRENT @ 115V (amps)	INPUT CURRENT @ 230V (amps)
RS6401-07X032-RED	110	80	20	2.86	1.49
RS6401-07X048-RED	160	120	20	4.08	2.12
RS6401-07X064-RED	210	160	20	5.30	2.75
RS6401-07X080-RED	260	200	20	6.51	3.39
RS6401-07X096-RED	310	240	20	7.73	4.02
RS6401-07X112-RED	360	280	20	8.95	4.66
RS6401-07X128-RED	410	320	20	10.17	5.29
RS6401-07X144-RED	470	360	20	11.38	5.92
RS6401-07X160-RED	520	400	20	12.60	6.56
RS6401-07X176-RED	570	440	20	N/A	7.19
RS6401-07X192-RED	620	480	20	N/A	7.83
RS6401-07X208-RED	670	520	20	N/A	8.46
RS6401-07X224-RED	720	560	20	N/A	9.09
RS6401-07X240-RED	770	600	20	N/A	9.73
RS6401-07X256-RED	820	640	20	N/A	10.36
RS6401-07X032-AMB	110	80	20	4.33	2.23
RS6401-07X048-AMB	160	120	20	6.29	3.24
RS6401-07X064-AMB	210	160	20	8.25	4.25
RS6401-07X080-AMB	260	200	20	10.21	5.26
RS6401-07X096-AMB	310	240	20	12.17	6.27
RS6401-07X112-AMB	360	280	20	14.13	7.28
RS6401-07X128-AMB	410	320	20	16.09	8.29
RS6401-07X144-AMB	470	360	20	18.05	9.30
RS6401-07X160-AMB	520	400	20	20.01	10.31

SIGN SECTION MODEL NUMBER	SIGN WEIGHT (lbs)	Width	Height	INPUT CURRENT @ 115V (amps)	INPUT CURRENT @ 230V (amps)
RS6401-07X176-AMB	570	440	20	N/A	11.32
RS6401-07X192-AMB	620	480	20	N/A	12.33
RS6401-07X208-AMB	670	520	20	N/A	13.35
RS6401-07X224-AMB	720	560	20	N/A	14.36
RS6401-07X240-AMB	770	600	20	N/A	15.37
RS6401-07X256-AMB	820	640	20	N/A	16.38
RS8901-07X032-RED	170	112	28	4.60	2.38
RS8901-07X048-RED	250	168	28	6.56	3.39
RS8901-07X064-RED	330	224	28	8.52	4.40
RS8901-07X080-RED	420	280	28	10.48	5.41
RS8901-07X096-RED	500	336	28	12.44	6.42
RS8901-07X112-RED	580	392	28	14.40	7.43
RS8901-07X128-RED	660	448	28	16.36	8.44
RS8901-07X144-RED	750	504	28	18.32	9.45
RS8901-07X160-RED	830	560	28	20.28	10.46
RS8901-07X176-RED	910	616	28	N/A	11.48
RS8901-07X192-RED	990	672	28	N/A	12.49
RS8901-07X208-RED	1080	728	28	N/A	13.50
RS8901-07X224-RED	1160	784	28	N/A	14.51
RS8901-07X240-RED	1240	840	28	N/A	15.52
RS8901-07X256-RED	1320	896	28	N/A	16.53
RS8901-07X032-AMB	170	112	28	6.34	3.27
RS8901-07X048-AMB	250	168	28	9.16	4.72
RS8901-07X064-AMB	330	224	28	11.98	6.17

SIGN SECTION MODEL NUMBER	SIGN WEIGHT (lbs)	Width	Height	INPUT CURRENT @ 115V (amps)	INPUT CURRENT @ 230V (amps)
RS8901-07X080-AMB	420	280	28	14.81	7.62
RS8901-07X096-AMB	500	336	28	17.63	9.07
RS8901-07X112-AMB	580	392	28	20.46	10.52
RS8901-07X128-AMB	660	448	28	23.28	11.97
RS8901-07X144-AMB	750	504	28	26.10	13.43
RS8901-07X160-AMB	830	560	28	28.93	14.88
RS8901-07X176-AMB	910	616	28	N/A	16.33
RS8901-07X192-AMB	990	672	28	N/A	17.78
RS8901-07X208-AMB	1080	728	28	N/A	19.23
RS8901-07X224-AMB	1160	784	28	N/A	20.68
RS8901-07X240-AMB	1240	840	28	N/A	22.13
RS8901-07X256-AMB	1320	896	28	N/A	23.58
RS6401-16X032-RED	230	80	40	5.78	3.00
RS6401-16X048-RED	350	120	40	8.45	4.39
RS6401-16X064-RED	460	160	40	11.13	5.78
RS6401-16X080-RED	580	200	40	13.80	7.17
RS6401-16X096-RED	690	240	40	16.47	8.56
RS6401-16X112-RED	800	280	40	19.15	9.95
RS6401-16X128-RED	920	320	40	21.82	11.34
RS6401-16X144-RED	1030	360	40	24.50	12.73
RS6401-16X160-RED	1150	400	40	27.17	14.12
RS6401-16X176-RED	1260	440	40	N/A	15.51
RS6401-16X192-RED	1380	480	40	N/A	16.90
RS6401-16X208-RED	1490	520	40	N/A	18.29
RS6401-16X224-RED	1600	560	40	N/A	19.68
RS6401-16X240-RED	1720	600	40	N/A	21.07
RS6401-16X256-RED	1830	640	40	N/A	22.46
RS6401-16X032-AMB	230	80	40	9.16	4.71
RS6401-16X048-AMB	350	120	40	13.53	6.96
RS6401-16X064-AMB	460	160	40	17.91	9.22
RS6401-16X080-AMB	580	200	40	22.28	11.47
RS6401-16X096-AMB	690	240	40	26.66	13.72
RS6401-16X112-AMB	800	280	40	31.03	15.97
RS6401-16X128-AMB	920	320	40	35.41	18.22
RS6401-16X144-AMB	1030	360	40	39.78	20.48
RS6401-16X160-AMB	1150	400	40	44.16	22.73
RS6401-16X176-AMB	1260	440	40	N/A	24.98
RS6401-16X192-AMB	1380	480	40	N/A	27.23
RS6401-16X208-AMB	1490	520	40	N/A	29.49
RS6401-16X224-AMB	1600	560	40	N/A	31.74
RS6401-16X240-AMB	1720	600	40	N/A	33.99
RS6401-16X256-AMB	1830	640	40	N/A	36.24

SIGN SECTION MODEL NUMBER	SIGN WEIGHT (lbs)	Width	Height	INPUT CURRENT @ 115V (amps)	INPUT CURRENT @ 230V (amps)
RS8901-16X032-RED	370	112	56	9.43	4.86
RS8901-16X048-RED	550	168	56	13.80	7.11
RS8901-16X064-RED	730	224	56	18.18	9.37
RS8901-16X080-RED	910	280	56	22.55	11.62
RS8901-16X096-RED	1100	336	56	26.93	13.87
RS8901-16X112-RED	1280	392	56	31.30	16.12
RS8901-16X128-RED	1460	448	56	35.68	18.38
RS8901-16X144-RED	1640	504	56	40.05	20.63
RS8901-16X160-RED	1820	560	56	44.43	22.88
RS8901-16X176-RED	2000	616	56	N/A	25.13
RS8901-16X192-RED	2190	672	56	N/A	27.38
RS8901-16X208-RED	2370	728	56	N/A	29.64
RS8901-16X224-RED	2550	784	56	N/A	31.89
RS8901-16X240-RED	2730	840	56	N/A	34.14
RS8901-16X256-RED	2910	896	56	N/A	36.39
RS8901-16X032-AMB	370	112	56	13.38	6.88
RS8901-16X048-AMB	550	168	56	19.73	10.14
RS8901-16X064-AMB	730	224	56	26.08	13.40
RS8901-16X080-AMB	910	280	56	32.43	16.66
RS8901-16X096-AMB	1100	336	56	38.78	19.92
RS8901-16X112-AMB	1280	392	56	45.13	23.18
RS8901-16X128-AMB	1460	448	56	51.47	26.44
RS8901-16X144-AMB	1640	504	56	57.82	29.69
RS8901-16X160-AMB	1820	560	56	64.17	32.95
RS8901-16X176-AMB	2000	616	56	N/A	36.21
RS8901-16X192-AMB	2190	672	56	N/A	39.47
RS8901-16X208-AMB	2370	728	56	N/A	42.73
RS8901-16X224-AMB	2550	784	56	N/A	45.99
RS8901-16X240-AMB	2730	840	56	N/A	49.25
RS8901-16X256-AMB	2910	896	56	N/A	52.51
RS6401-24X032-RED	350	80	60	8.45	4.39
RS6401-24X048-RED	520	120	60	12.46	6.47
RS6401-24X064-RED	690	160	60	16.47	8.56
RS6401-24X080-RED	860	200	60	20.49	10.64
RS6401-24X096-RED	1030	240	60	24.50	12.73
RS6401-24X112-RED	1200	280	60	28.51	14.82
RS6401-24X128-RED	1380	320	60	32.52	16.90
RS6401-24X144-RED	1550	360	60	36.53	18.99
RS6401-24X160-RED	1720	400	60	40.54	21.07
RS6401-24X176-RED	1890	440	60	N/A	23.16
RS6401-24X192-RED	2060	480	60	N/A	25.24
RS6401-24X208-RED	2230	520	60	N/A	27.33

SIGN SECTION MODEL NUMBER	SIGN WEIGHT (lbs)	Width	Height	INPUT CURRENT @ 115V (amps)	INPUT CURRENT @ 230V (amps)
RS6401-24X224-RED	2400	560	60	N/A	29.41
RS6401-24X240-RED	2570	600	60	N/A	31.50
RS6401-24X256-RED	2750	640	60	N/A	33.58
RS6401-24X032-AMB	350	80	60	13.53	6.96
RS6401-24X048-AMB	520	120	60	20.09	10.34
RS6401-24X064-AMB	690	160	60	26.66	13.72
RS6401-24X080-AMB	860	200	60	33.22	17.10
RS6401-24X096-AMB	1030	240	60	39.78	20.48
RS6401-24X112-AMB	1200	280	60	46.34	23.86
RS6401-24X128-AMB	1380	320	60	52.91	27.23
RS6401-24X144-AMB	1550	360	60	59.47	30.61
RS6401-24X160-AMB	1720	400	60	66.03	33.99
RS6401-24X176-AMB	1890	440	60	N/A	37.37
RS6401-24X192-AMB	2060	480	60	N/A	40.75
RS6401-24X208-AMB	2230	520	60	N/A	44.13
RS6401-24X224-AMB	2400	560	60	N/A	47.50
RS6401-24X240-AMB	2570	600	60	N/A	50.88
RS6401-24X256-AMB	2750	640	60	N/A	54.26
RS8901-24X032-RED	550	112	84	13.80	7.11
RS8901-24X048-RED	820	168	84	20.36	10.49
RS8901-24X064-RED	1100	224	84	26.93	13.87
RS8901-24X080-RED	1370	280	84	33.49	17.25
RS8901-24X096-RED	1640	336	84	40.05	20.63
RS8901-24X112-RED	1910	392	84	46.61	24.01
RS8901-24X128-RED	2190	448	84	53.18	27.38
RS8901-24X144-RED	2460	504	84	59.74	30.76
RS8901-24X160-RED	2730	560	84	66.30	34.14
RS8901-24X176-RED	3000	616	84	N/A	37.52
RS8901-24X192-RED	3280	672	84	N/A	40.90
RS8901-24X208-RED	3550	728	84	N/A	44.28
RS8901-24X224-RED	3820	784	84	N/A	47.66
RS8901-24X240-RED	4090	840	84	N/A	51.03
RS8901-24X256-RED	4370	896	84	N/A	54.41
RS8901-24X032-AMB	550	112	84	19.73	10.14
RS8901-24X048-AMB	820	168	84	29.25	15.03
RS8901-24X064-AMB	1100	224	84	38.78	19.92
RS8901-24X080-AMB	1370	280	84	48.30	24.81
RS8901-24X096-AMB	1640	336	84	57.82	29.69
RS8901-24X112-AMB	1910	392	84	67.34	34.58
RS8901-24X128-AMB	2190	448	84	76.87	39.47
RS8901-24X144-AMB	2460	504	84	86.39	44.36
RS8901-24X160-AMB	2730	560	84	95.91	49.25

SIGN SECTION MODEL NUMBER	SIGN WEIGHT (lbs)	Width	Height	INPUT CURRENT @ 115V (amps)	INPUT CURRENT @ 230V (amps)
RS8901-24X176-AMB	3000	616	84	N/A	54.14
RS8901-24X192-AMB	3280	672	84	N/A	59.02
RS8901-24X208-AMB	3550	728	84	N/A	63.91
RS8901-24X224-AMB	3820	784	84	N/A	68.80
RS8901-24X240-AMB	4090	840	84	N/A	73.69
RS8901-24X256-AMB	4370	896	84	N/A	78.58
RS6401-32X032-RED	460	80	80	11.13	5.78
RS6401-32X048-RED	690	120	80	16.47	8.56
RS6401-32X064-RED	920	160	80	21.82	11.34
RS6401-32X080-RED	1150	200	80	27.17	14.12
RS6401-32X096-RED	1380	240	80	32.52	16.90
RS6401-32X112-RED	1600	280	80	37.87	19.68
RS6401-32X128-RED	1830	320	80	43.22	22.46
RS6401-32X144-RED	2060	360	80	48.57	25.24
RS6401-32X160-RED	2290	400	80	53.91	28.02
RS6401-32X176-RED	2520	440	80	N/A	30.80
RS6401-32X192-RED	2750	480	80	N/A	33.58
RS6401-32X208-RED	2970	520	80	N/A	36.36
RS6401-32X224-RED	3200	560	80	N/A	39.14
RS6401-32X240-RED	3430	600	80	N/A	41.92
RS6401-32X256-RED	3660	640	80	N/A	44.70
RS6401-32X032-AMB	460	80	80	17.91	9.22
RS6401-32X048-AMB	690	120	80	26.66	13.72
RS6401-32X064-AMB	920	160	80	35.41	18.22
RS6401-32X080-AMB	1150	200	80	44.16	22.73
RS6401-32X096-AMB	1380	240	80	52.91	27.23
RS6401-32X112-AMB	1600	280	80	61.66	31.74
RS6401-32X128-AMB	1830	320	80	70.41	36.24
RS6401-32X144-AMB	2060	360	80	79.16	40.75
RS6401-32X160-AMB	2290	400	80	87.91	45.25
RS6401-32X176-AMB	2520	440	80	N/A	49.76
RS6401-32X192-AMB	2750	480	80	N/A	54.26
RS6401-32X208-AMB	2970	520	80	N/A	58.77
RS6401-32X224-AMB	3200	560	80	N/A	63.27
RS6401-32X240-AMB	3430	600	80	N/A	67.77
RS6401-32X256-AMB	3660	640	80	N/A	72.28
RS8901-32X032-RED	730	112	112	18.18	9.37
RS8901-32X048-RED	1100	168	112	26.93	13.87
RS8901-32X064-RED	1460	224	112	35.68	18.38
RS8901-32X080-RED	1820	280	112	44.43	22.88
RS8901-32X096-RED	2190	336	112	53.18	27.38
RS8901-32X112-RED	2550	392	112	61.93	31.89

SIGN SECTION MODEL NUMBER	SIGN WEIGHT (lbs)	Width	Height	INPUT CURRENT @ 115V (amps)	INPUT CURRENT @ 230V (amps)
RS8901-32X128-RED	2910	448	112	70.68	36.39
RS8901-32X144-RED	3280	504	112	79.43	40.90
RS8901-32X160-RED	3640	560	112	88.18	45.40
RS8901-32X176-RED	4000	616	112	N/A	49.91
RS8901-32X192-RED	4370	672	112	N/A	54.41
RS8901-32X208-RED	4730	728	112	N/A	58.92
RS8901-32X224-RED	5090	784	112	N/A	63.42
RS8901-32X240-RED	5460	840	112	N/A	67.93
RS8901-32X256-RED	5820	896	112	N/A	72.43
RS8901-32X032-AMB	730	112	112	26.08	13.40
RS8901-32X048-AMB	1100	168	112	38.78	19.92
RS8901-32X064-AMB	1460	224	112	51.47	26.44
RS8901-32X080-AMB	1820	280	112	64.17	32.95
RS8901-32X096-AMB	2190	336	112	76.87	39.47
RS8901-32X112-AMB	2550	392	112	89.56	45.99
RS8901-32X128-AMB	2910	448	112	102.26	52.51
RS8901-32X144-AMB	3280	504	112	114.96	59.02
RS8901-32X160-AMB	3640	560	112	127.65	65.54
RS8901-32X176-AMB	4000	616	112	N/A	72.06
RS8901-32X192-AMB	4370	672	112	N/A	78.58
RS8901-32X208-AMB	4730	728	112	N/A	85.10
RS8901-32X224-AMB	5090	784	112	N/A	91.61
RS8901-32X240-AMB	5460	840	112	N/A	98.13
RS8901-32X256-AMB	5820	896	112	N/A	104.65
RS6401-40X032-RED	580	80	100	13.80	7.17
RS6401-40X048-RED	860	120	100	20.49	10.64
RS6401-40X064-RED	1150	160	100	27.17	14.12
RS6401-40X080-RED	1430	200	100	33.86	17.60
RS6401-40X096-RED	1720	240	100	40.54	21.07
RS6401-40X112-RED	2000	280	100	47.23	24.55
RS6401-40X128-RED	2290	320	100	53.91	28.02
RS6401-40X144-RED	2570	360	100	60.60	31.50
RS6401-40X160-RED	2860	400	100	67.29	34.97
RS6401-40X176-RED	3140	440	100	N/A	38.45
RS6401-40X192-RED	3430	480	100	N/A	41.92
RS6401-40X208-RED	3720	520	100	N/A	45.40
RS6401-40X224-RED	4000	560	100	N/A	48.87
RS6401-40X240-RED	4290	600	100	N/A	52.35
RS6401-40X256-RED	4570	640	100	N/A	55.83
RS6401-40X032-AMB	580	80	100	22.28	11.47
RS6401-40X048-AMB	860	120	100	33.22	17.10
RS6401-40X064-AMB	1150	160	100	44.16	22.73

SIGN SECTION MODEL NUMBER	SIGN WEIGHT (lbs)	Width	Height	INPUT CURRENT @ 115V (amps)	INPUT CURRENT @ 230V (amps)
RS6401-40X080-AMB	1430	200	100	55.09	28.36
RS6401-40X096-AMB	1720	240	100	66.03	33.99
RS6401-40X112-AMB	2000	280	100	76.97	39.62
RS6401-40X128-AMB	2290	320	100	87.91	45.25
RS6401-40X144-AMB	2570	360	100	98.85	50.88
RS6401-40X160-AMB	2860	400	100	109.78	56.51
RS6401-40X176-AMB	3140	440	100	N/A	62.14
RS6401-40X192-AMB	3430	480	100	N/A	67.77
RS6401-40X208-AMB	3720	520	100	N/A	73.41
RS6401-40X224-AMB	4000	560	100	N/A	79.04
RS6401-40X240-AMB	4290	600	100	N/A	84.67
RS6401-40X256-AMB	4570	640	100	N/A	90.30
RS8901-40X032-RED	910	112	140	22.55	11.62
RS8901-40X048-RED	1370	168	140	33.49	17.25
RS8901-40X064-RED	1820	224	140	44.43	22.88
RS8901-40X080-RED	2280	280	140	55.36	28.51
RS8901-40X096-RED	2730	336	140	66.30	34.14
RS8901-40X112-RED	3190	392	140	77.24	39.77
RS8901-40X128-RED	3640	448	140	88.18	45.40
RS8901-40X144-RED	4090	504	140	99.12	51.03
RS8901-40X160-RED	4550	560	140	110.05	56.66
RS8901-40X176-RED	5000	616	140	N/A	62.30
RS8901-40X192-RED	5460	672	140	N/A	67.93
RS8901-40X208-RED	5910	728	140	N/A	73.56
RS8901-40X224-RED	6370	784	140	N/A	79.19
RS8901-40X240-RED	6820	840	140	N/A	84.82
RS8901-40X256-RED	7280	896	140	N/A	90.45
RS8901-40X032-AMB	910	112	140	32.43	16.66
RS8901-40X048-AMB	1370	168	140	48.30	24.81
RS8901-40X064-AMB	1820	224	140	64.17	32.95
RS8901-40X080-AMB	2280	280	140	80.04	41.10
RS8901-40X096-AMB	2730	336	140	95.91	49.25
RS8901-40X112-AMB	3190	392	140	111.78	57.40
RS8901-40X128-AMB	3640	448	140	127.65	65.54
RS8901-40X144-AMB	4090	504	140	143.52	73.69
RS8901-40X160-AMB	4550	560	140	159.40	81.84
RS8901-40X176-AMB	5000	616	140	N/A	89.98
RS8901-40X192-AMB	5460	672	140	N/A	98.13
RS8901-40X208-AMB	5910	728	140	N/A	106.28
RS8901-40X224-AMB	6370	784	140	N/A	114.43
RS8901-40X240-AMB	6820	840	140	N/A	122.57
RS8901-40X256-AMB	7280	896	140	N/A	130.72

SIGN SECTION MODEL NUMBER	SIGN WEIGHT (lbs)	Width	Height	INPUT CURRENT @ 115V (amps)	INPUT CURRENT @ 230V (amps)
RS6401-48X032-RED	690	80	120	16.47	8.56
RS6401-48X048-RED	1030	120	120	24.50	12.73
RS6401-48X064-RED	1380	160	120	32.52	16.90
RS6401-48X080-RED	1720	200	120	40.54	21.07
RS6401-48X096-RED	2060	240	120	48.57	25.24
RS6401-48X112-RED	2400	280	120	56.59	29.41
RS6401-48X128-RED	2750	320	120	64.61	33.58
RS6401-48X144-RED	3090	360	120	72.63	37.75
RS6401-48X160-RED	3430	400	120	80.66	41.92
RS6401-48X176-RED	3770	440	120	N/A	46.09
RS6401-48X192-RED	4120	480	120	N/A	50.26
RS6401-48X208-RED	4460	520	120	N/A	54.44
RS6401-48X224-RED	4800	560	120	N/A	58.61
RS6401-48X240-RED	5140	600	120	N/A	62.78
RS6401-48X256-RED	5490	640	120	N/A	66.95
RS6401-48X032-AMB	690	80	120	26.66	13.72
RS6401-48X048-AMB	1030	120	120	39.78	20.48
RS6401-48X064-AMB	1380	160	120	52.91	27.23
RS6401-48X080-AMB	1720	200	120	66.03	33.99
RS6401-48X096-AMB	2060	240	120	79.16	40.75
RS6401-48X112-AMB	2400	280	120	92.28	47.50
RS6401-48X128-AMB	2750	320	120	105.41	54.26
RS6401-48X144-AMB	3090	360	120	118.53	61.02
RS6401-48X160-AMB	3430	400	120	131.66	67.77
RS6401-48X176-AMB	3770	440	120	N/A	74.53
RS6401-48X192-AMB	4120	480	120	N/A	81.29
RS6401-48X208-AMB	4460	520	120	N/A	88.05
RS6401-48X224-AMB	4800	560	120	N/A	94.80
RS6401-48X240-AMB	5140	600	120	N/A	101.56
RS6401-48X256-AMB	5490	640	120	N/A	108.32
RS8901-48X032-RED	1100	112	168	26.93	13.87
RS8901-48X048-RED	1640	168	168	40.05	20.63
RS8901-48X064-RED	2190	224	168	53.18	27.38
RS8901-48X080-RED	2730	280	168	66.30	34.14
RS8901-48X096-RED	3280	336	168	79.43	40.90
RS8901-48X112-RED	3820	392	168	92.55	47.66
RS8901-48X128-RED	4370	448	168	105.68	54.41
RS8901-48X144-RED	4910	504	168	118.80	61.17
RS8901-48X160-RED	5460	560	168	131.93	67.93
RS8901-48X176-RED	6000	616	168	N/A	74.68
RS8901-48X192-RED	6550	672	168	N/A	81.44
RS8901-48X208-RED	7090	728	168	N/A	88.20

SIGN SECTION MODEL NUMBER	SIGN WEIGHT (lbs)	Width	Height	INPUT CURRENT @ 115V (amps)	INPUT CURRENT @ 230V (amps)
RS8901-48X224-RED	7640	784	168	N/A	94.95
RS8901-48X240-RED	8180	840	168	N/A	101.71
RS8901-48X256-RED	8730	896	168	N/A	108.47
RS8901-48X032-AMB	1100	112	168	38.78	19.92
RS8901-48X048-AMB	1640	168	168	57.82	29.69
RS8901-48X064-AMB	2190	224	168	76.87	39.47
RS8901-48X080-AMB	2730	280	168	95.91	49.25
RS8901-48X096-AMB	3280	336	168	114.96	59.02
RS8901-48X112-AMB	3820	392	168	134.00	68.80
RS8901-48X128-AMB	4370	448	168	153.05	78.58
RS8901-48X144-AMB	4910	504	168	172.09	88.36
RS8901-48X160-AMB	5460	560	168	191.14	98.13
RS8901-48X176-AMB	6000	616	168	N/A	107.91
RS8901-48X192-AMB	6550	672	168	N/A	117.69
RS8901-48X208-AMB	7090	728	168	N/A	127.46
RS8901-48X224-AMB	7640	784	168	N/A	137.24
RS8901-48X240-AMB	8180	840	168	N/A	147.02
RS8901-48X256-AMB	8730	896	168	N/A	156.79
RS6401-56X032-RED	800	80	140	19.15	9.95
RS6401-56X048-RED	1200	120	140	28.51	14.82
RS6401-56X064-RED	1600	160	140	37.87	19.68
RS6401-56X080-RED	2000	200	140	47.23	24.55
RS6401-56X096-RED	2400	240	140	56.59	29.41
RS6401-56X112-RED	2800	280	140	65.95	34.28
RS6401-56X128-RED	3200	320	140	75.31	39.14
RS6401-56X144-RED	3600	360	140	84.67	44.01
RS6401-56X160-RED	4000	400	140	94.03	48.87
RS6401-56X176-RED	4400	440	140	N/A	53.74
RS6401-56X192-RED	4800	480	140	N/A	58.61
RS6401-56X208-RED	5200	520	140	N/A	63.47
RS6401-56X224-RED	5600	560	140	N/A	68.34
RS6401-56X240-RED	6000	600	140	N/A	73.20
RS6401-56X256-RED	6400	640	140	N/A	78.07
RS6401-56X032-AMB	800	80	140	31.03	15.97
RS6401-56X048-AMB	1200	120	140	46.34	23.86
RS6401-56X064-AMB	1600	160	140	61.66	31.74
RS6401-56X080-AMB	2000	200	140	76.97	39.62
RS6401-56X096-AMB	2400	240	140	92.28	47.50
RS6401-56X112-AMB	2800	280	140	107.60	55.39
RS6401-56X128-AMB	3200	320	140	122.91	63.27
RS6401-56X144-AMB	3600	360	140	138.22	71.15
RS6401-56X160-AMB	4000	400	140	153.54	79.04

SIGN SECTION MODEL NUMBER	SIGN WEIGHT (lbs)	Width	Height	INPUT CURRENT @ 115V (amps)	INPUT CURRENT @ 230V (amps)
RS6401-56X176-AMB	4400	440	140	N/A	86.92
RS6401-56X192-AMB	4800	480	140	N/A	94.80
RS6401-56X208-AMB	5200	520	140	N/A	102.69
RS6401-56X224-AMB	5600	560	140	N/A	110.57
RS6401-56X240-AMB	6000	600	140	N/A	118.45
RS6401-56X256-AMB	6400	640	140	N/A	126.33
RS8901-56X032-RED	1280	112	196	31.30	16.12
RS8901-56X048-RED	1910	168	196	46.61	24.01
RS8901-56X064-RED	2550	224	196	61.93	31.89
RS8901-56X080-RED	3190	280	196	77.24	39.77
RS8901-56X096-RED	3820	336	196	92.55	47.66
RS8901-56X112-RED	4460	392	196	107.87	55.54
RS8901-56X128-RED	5090	448	196	123.18	63.42
RS8901-56X144-RED	5730	504	196	138.49	71.30
RS8901-56X160-RED	6370	560	196	153.81	79.19
RS8901-56X176-RED	7000	616	196	N/A	87.07
RS8901-56X192-RED	7640	672	196	N/A	94.95
RS8901-56X208-RED	8280	728	196	N/A	102.84
RS8901-56X224-RED	8910	784	196	N/A	110.72
RS8901-56X240-RED	9550	840	196	N/A	118.60
RS8901-56X256-RED	10180	896	196	N/A	126.49
RS8901-56X032-AMB	1280	112	196	45.13	23.18
RS8901-56X048-AMB	1910	168	196	67.34	34.58
RS8901-56X064-AMB	2550	224	196	89.56	45.99
RS8901-56X080-AMB	3190	280	196	111.78	57.40
RS8901-56X096-AMB	3820	336	196	134.00	68.80
RS8901-56X112-AMB	4460	392	196	156.22	80.21
RS8901-56X128-AMB	5090	448	196	178.44	91.61
RS8901-56X144-AMB	5730	504	196	200.66	103.02
RS8901-56X160-AMB	6370	560	196	222.88	114.43
RS8901-56X176-AMB	7000	616	196	N/A	125.83
RS8901-56X192-AMB	7640	672	196	N/A	137.24
RS8901-56X208-AMB	8280	728	196	N/A	148.65
RS8901-56X224-AMB	8910	784	196	N/A	160.05
RS8901-56X240-AMB	9550	840	196	N/A	171.46
RS8901-56X256-AMB	10180	896	196	N/A	182.87
RS6401-64X032-RED	920	80	160	21.82	11.34
RS6401-64X048-RED	1380	120	160	32.52	16.90
RS6401-64X064-RED	1830	160	160	43.22	22.46
RS6401-64X080-RED	2290	200	160	53.91	28.02
RS6401-64X096-RED	2750	240	160	64.61	33.58
RS6401-64X112-RED	3200	280	160	75.31	39.14

SIGN SECTION MODEL NUMBER	SIGN WEIGHT (lbs)	Width	Height	INPUT CURRENT @ 115V (amps)	INPUT CURRENT @ 230V (amps)
RS6401-64X128-RED	3660	320	160	86.01	44.70
RS6401-64X144-RED	4120	360	160	96.70	50.26
RS6401-64X160-RED	4570	400	160	107.40	55.83
RS6401-64X176-RED	5030	440	160	N/A	61.39
RS6401-64X192-RED	5490	480	160	N/A	66.95
RS6401-64X208-RED	5940	520	160	N/A	72.51
RS6401-64X224-RED	6400	560	160	N/A	78.07
RS6401-64X240-RED	6860	600	160	N/A	83.63
RS6401-64X256-RED	7310	640	160	N/A	89.19
RS6401-64X032-AMB	920	80	160	35.41	18.22
RS6401-64X048-AMB	1380	120	160	52.91	27.23
RS6401-64X064-AMB	1830	160	160	70.41	36.24
RS6401-64X080-AMB	2290	200	160	87.91	45.25
RS6401-64X096-AMB	2750	240	160	105.41	54.26
RS6401-64X112-AMB	3200	280	160	122.91	63.27
RS6401-64X128-AMB	3660	320	160	140.41	72.28
RS6401-64X144-AMB	4120	360	160	157.91	81.29
RS6401-64X160-AMB	4570	400	160	175.41	90.30
RS6401-64X176-AMB	5030	440	160	N/A	99.31
RS6401-64X192-AMB	5490	480	160	N/A	108.32
RS6401-64X208-AMB	5940	520	160	N/A	117.33
RS6401-64X224-AMB	6400	560	160	N/A	126.33
RS6401-64X240-AMB	6860	600	160	N/A	135.34
RS6401-64X256-AMB	7310	640	160	N/A	144.35
RS8901-64X032-RED	1460	112	224	35.68	18.38
RS8901-64X048-RED	2190	168	224	53.18	27.38
RS8901-64X064-RED	2910	224	224	70.68	36.39
RS8901-64X080-RED	3640	280	224	88.18	45.40
RS8901-64X096-RED	4370	336	224	105.68	54.41
RS8901-64X112-RED	5090	392	224	123.18	63.42
RS8901-64X128-RED	5820	448	224	140.68	72.43
RS8901-64X144-RED	6550	504	224	158.18	81.44
RS8901-64X160-RED	7280	560	224	175.68	90.45
RS8901-64X176-RED	8000	616	224	N/A	99.46
RS8901-64X192-RED	8730	672	224	N/A	108.47
RS8901-64X208-RED	9460	728	224	N/A	117.48
RS8901-64X224-RED	10180	784	224	N/A	126.49
RS8901-64X240-RED	10910	840	224	N/A	135.49
RS8901-64X256-RED	11640	896	224	N/A	144.50
RS8901-64X032-AMB	1460	112	224	51.47	26.44
RS8901-64X048-AMB	2190	168	224	76.87	39.47
RS8901-64X064-AMB	2910	224	224	102.26	52.51



SIGN SECTION MODEL NUMBER	SIGN WEIGHT (lbs)	Width	Height	INPUT CURRENT @ 115V (amps)	INPUT CURRENT @ 230V (amps)
RS8901-64X080-AMB	3640	280	224	127.65	65.54
RS8901-64X096-AMB	4370	336	224	153.05	78.58
RS8901-64X112-AMB	5090	392	224	178.44	91.61
RS8901-64X128-AMB	5820	448	224	203.83	104.65
RS8901-64X144-AMB	6550	504	224	229.23	117.69
RS8901-64X160-AMB	7280	560	224	254.62	130.72
RS8901-64X176-AMB	8000	616	224	N/A	143.76
RS8901-64X192-AMB	8730	672	224	N/A	156.79
RS8901-64X208-AMB	9460	728	224	N/A	169.83
RS8901-64X224-AMB	10180	784	224	N/A	182.87
RS8901-64X240-AMB	10910	840	224	N/A	195.90
RS8901-64X256-AMB	11640	896	224	N/A	208.94
RS6401-72X032-RED	1030	80	180	24.50	12.73
RS6401-72X048-RED	1550	120	180	36.53	18.99
RS6401-72X064-RED	2060	160	180	48.57	25.24
RS6401-72X080-RED	2570	200	180	60.60	31.50
RS6401-72X096-RED	3090	240	180	72.63	37.75
RS6401-72X112-RED	3600	280	180	84.67	44.01
RS6401-72X128-RED	4120	320	180	96.70	50.26
RS6401-72X144-RED	4630	360	180	108.74	56.52
RS6401-72X160-RED	5140	400	180	120.77	62.78
RS6401-72X176-RED	5660	440	180	N/A	69.03
RS6401-72X192-RED	6170	480	180	N/A	75.29
RS6401-72X208-RED	6680	520	180	N/A	81.54
RS6401-72X224-RED	7200	560	180	N/A	87.80
RS6401-72X240-RED	7710	600	180	N/A	94.06
RS6401-72X256-RED	8230	640	180	N/A	100.31
RS6401-72X032-AMB	1030	80	180	39.78	20.48
RS6401-72X048-AMB	1550	120	180	59.47	30.61
RS6401-72X064-AMB	2060	160	180	79.16	40.75
RS6401-72X080-AMB	2570	200	180	98.85	50.88
RS6401-72X096-AMB	3090	240	180	118.53	61.02
RS6401-72X112-AMB	3600	280	180	138.22	71.15
RS6401-72X128-AMB	4120	320	180	157.91	81.29
RS6401-72X144-AMB	4630	360	180	177.60	91.42
RS6401-72X160-AMB	5140	400	180	197.29	101.56
RS6401-72X176-AMB	5660	440	180	N/A	111.69
RS6401-72X192-AMB	6170	480	180	N/A	121.83
RS6401-72X208-AMB	6680	520	180	N/A	131.96
RS6401-72X224-AMB	7200	560	180	N/A	142.10
RS6401-72X240-AMB	7710	600	180	N/A	152.24
RS6401-72X256-AMB	8230	640	180	N/A	162.37

SIGN SECTION MODEL NUMBER	SIGN WEIGHT (lbs)	Width	Height	INPUT CURRENT @ 115V (amps)	INPUT CURRENT @ 230V (amps)
RS8901-72X032-RED	1640	112	252	40.05	20.63
RS8901-72X048-RED	2460	168	252	59.74	30.76
RS8901-72X064-RED	3280	224	252	79.43	40.90
RS8901-72X080-RED	4090	280	252	99.12	51.03
RS8901-72X096-RED	4910	336	252	118.80	61.17
RS8901-72X112-RED	5730	392	252	138.49	71.30
RS8901-72X128-RED	6550	448	252	158.18	81.44
RS8901-72X144-RED	7370	504	252	177.87	91.57
RS8901-72X160-RED	8180	560	252	197.56	101.71
RS8901-72X176-RED	9000	616	252	N/A	111.85
RS8901-72X192-RED	9820	672	252	N/A	121.98
RS8901-72X208-RED	10640	728	252	N/A	132.12
RS8901-72X224-RED	11460	784	252	N/A	142.25
RS8901-72X240-RED	12270	840	252	N/A	152.39
RS8901-72X256-RED	13090	896	252	N/A	162.52
RS8901-72X032-AMB	1640	112	252	57.82	29.69
RS8901-72X048-AMB	2460	168	252	86.39	44.36
RS8901-72X064-AMB	3280	224	252	114.96	59.02
RS8901-72X080-AMB	4090	280	252	143.52	73.69
RS8901-72X096-AMB	4910	336	252	172.09	88.36
RS8901-72X112-AMB	5730	392	252	200.66	103.02
RS8901-72X128-AMB	6550	448	252	229.23	117.69
RS8901-72X144-AMB	7370	504	252	257.79	132.35
RS8901-72X160-AMB	8180	560	252	286.36	147.02
RS8901-72X176-AMB	9000	616	252	N/A	161.68
RS8901-72X192-AMB	9820	672	252	N/A	176.35
RS8901-72X208-AMB	10640	728	252	N/A	191.01
RS8901-72X224-AMB	11460	784	252	N/A	205.68
RS8901-72X240-AMB	12270	840	252	N/A	220.34
RS8901-72X256-AMB	13090	896	252	N/A	235.01
RS6401-80X032-RED	1150	80	200	27.17	14.12
RS6401-80X048-RED	1720	120	200	40.54	21.07
RS6401-80X064-RED	2290	160	200	53.91	28.02
RS6401-80X080-RED	2860	200	200	67.29	34.97
RS6401-80X096-RED	3430	240	200	80.66	41.92
RS6401-80X112-RED	4000	280	200	94.03	48.87
RS6401-80X128-RED	4570	320	200	107.40	55.83
RS6401-80X144-RED	5140	360	200	120.77	62.78
RS6401-80X160-RED	5710	400	200	134.14	69.73
RS6401-80X176-RED	6280	440	200	N/A	76.68
RS6401-80X192-RED	6860	480	200	N/A	83.63
RS6401-80X208-RED	7430	520	200	N/A	90.58

SIGN SECTION MODEL NUMBER	SIGN WEIGHT (lbs)	Width	Height	INPUT CURRENT @ 115V (amps)	INPUT CURRENT @ 230V (amps)
RS6401-80X224-RED	8000	560	200	N/A	97.53
RS6401-80X240-RED	8570	600	200	N/A	104.48
RS6401-80X256-RED	9140	640	200	N/A	111.43
RS6401-80X032-AMB	1150	80	200	44.16	22.73
RS6401-80X048-AMB	1720	120	200	66.03	33.99
RS6401-80X064-AMB	2290	160	200	87.91	45.25
RS6401-80X080-AMB	2860	200	200	109.78	56.51
RS6401-80X096-AMB	3430	240	200	131.66	67.77
RS6401-80X112-AMB	4000	280	200	153.54	79.04
RS6401-80X128-AMB	4570	320	200	175.41	90.30
RS6401-80X144-AMB	5140	360	200	197.29	101.56
RS6401-80X160-AMB	5710	400	200	219.16	112.82
RS6401-80X176-AMB	6280	440	200	N/A	124.08
RS6401-80X192-AMB	6860	480	200	N/A	135.34
RS6401-80X208-AMB	7430	520	200	N/A	146.60
RS6401-80X224-AMB	8000	560	200	N/A	157.87
RS6401-80X240-AMB	8570	600	200	N/A	169.13
RS6401-80X256-AMB	9140	640	200	N/A	180.39
RS8901-80X032-RED	1820	112	280	44.43	22.88
RS8901-80X048-RED	2730	168	280	66.30	34.14
RS8901-80X064-RED	3640	224	280	88.18	45.40
RS8901-80X080-RED	4550	280	280	110.05	56.66
RS8901-80X096-RED	5460	336	280	131.93	67.93
RS8901-80X112-RED	6370	392	280	153.81	79.19
RS8901-80X128-RED	7280	448	280	175.68	90.45
RS8901-80X144-RED	8180	504	280	197.56	101.71
RS8901-80X160-RED	9090	560	280	219.43	112.97
RS8901-80X176-RED	10000	616	280	N/A	124.23
RS8901-80X192-RED	10910	672	280	N/A	135.49
RS8901-80X208-RED	11820	728	280	N/A	146.76
RS8901-80X224-RED	12730	784	280	N/A	158.02
RS8901-80X240-RED	13640	840	280	N/A	169.28
RS8901-80X256-RED	14550	896	280	N/A	180.54
RS8901-80X032-AMB	1820	112	280	64.17	32.95
RS8901-80X048-AMB	2730	168	280	95.91	49.25
RS8901-80X064-AMB	3640	224	280	127.65	65.54
RS8901-80X080-AMB	4550	280	280	159.40	81.84
RS8901-80X096-AMB	5460	336	280	191.14	98.13
RS8901-80X112-AMB	6370	392	280	222.88	114.43
RS8901-80X128-AMB	7280	448	280	254.62	130.72
RS8901-80X144-AMB	8180	504	280	286.36	147.02
RS8901-80X160-AMB	9090	560	280	318.10	163.31

SIGN SECTION MODEL NUMBER	SIGN WEIGHT (lbs)	Width	Height	INPUT CURRENT @ 115V (amps)	INPUT CURRENT @ 230V (amps)
RS8901-80X176-AMB	10000	616	280	N/A	179.61
RS8901-80X192-AMB	10910	672	280	N/A	195.90
RS8901-80X208-AMB	11820	728	280	N/A	212.20
RS8901-80X224-AMB	12730	784	280	N/A	228.49
RS8901-80X240-AMB	13640	840	280	N/A	244.79
RS8901-80X256-AMB	14550	896	280	N/A	261.08
RS6401-88X032-RED	1260	80	220	29.85	15.51
RS6401-88X048-RED	1890	120	220	44.55	23.16
RS6401-88X064-RED	2520	160	220	59.26	30.80
RS6401-88X080-RED	3140	200	220	73.97	38.45
RS6401-88X096-RED	3770	240	220	88.68	46.09
RS6401-88X112-RED	4400	280	220	103.39	53.74
RS6401-88X128-RED	5030	320	220	118.10	61.39
RS6401-88X144-RED	5660	360	220	132.81	69.03
RS6401-88X160-RED	6280	400	220	147.51	76.68
RS6401-88X176-RED	6910	440	220	N/A	84.32
RS6401-88X192-RED	7540	480	220	N/A	91.97
RS6401-88X208-RED	8170	520	220	N/A	99.62
RS6401-88X224-RED	8800	560	220	N/A	107.26
RS6401-88X240-RED	9420	600	220	N/A	114.91
RS6401-88X256-RED	10050	640	220	N/A	122.55
RS6401-88X032-AMB	1260	80	220	48.53	24.98
RS6401-88X048-AMB	1890	120	220	72.60	37.37
RS6401-88X064-AMB	2520	160	220	96.66	49.76
RS6401-88X080-AMB	3140	200	220	120.72	62.14
RS6401-88X096-AMB	3770	240	220	144.78	74.53
RS6401-88X112-AMB	4400	280	220	168.85	86.92
RS6401-88X128-AMB	5030	320	220	192.91	99.31
RS6401-88X144-AMB	5660	360	220	216.97	111.69
RS6401-88X160-AMB	6280	400	220	241.04	124.08
RS6401-88X176-AMB	6910	440	220	N/A	136.47
RS6401-88X192-AMB	7540	480	220	N/A	148.86
RS6401-88X208-AMB	8170	520	220	N/A	161.24
RS6401-88X224-AMB	8800	560	220	N/A	173.63
RS6401-88X240-AMB	9420	600	220	N/A	186.02
RS6401-88X256-AMB	10050	640	220	N/A	198.41
RS8901-88X032-RED	2000	112	308	48.80	25.13
RS8901-88X048-RED	3000	168	308	72.87	37.52
RS8901-88X064-RED	4000	224	308	96.93	49.91
RS8901-88X080-RED	5000	280	308	120.99	62.30
RS8901-88X096-RED	6000	336	308	145.05	74.68
RS8901-88X112-RED	7000	392	308	169.12	87.07

SIGN SECTION MODEL NUMBER	SIGN WEIGHT (lbs)	Width	Height	INPUT CURRENT @ 115V (amps)	INPUT CURRENT @ 230V (amps)
RS8901-88X128-RED	8000	448	308	193.18	99.46
RS8901-88X144-RED	9000	504	308	217.24	111.85
RS8901-88X160-RED	10000	560	308	241.31	124.23
RS8901-88X176-RED	11000	616	308	N/A	136.62
RS8901-88X192-RED	12000	672	308	N/A	149.01
RS8901-88X208-RED	13000	728	308	N/A	161.40
RS8901-88X224-RED	14000	784	308	N/A	173.78
RS8901-88X240-RED	15000	840	308	N/A	186.17
RS8901-88X256-RED	16000	896	308	N/A	198.56
RS8901-88X032-AMB	2000	112	308	70.52	36.21
RS8901-88X048-AMB	3000	168	308	105.43	54.14
RS8901-88X064-AMB	4000	224	308	140.35	72.06
RS8901-88X080-AMB	5000	280	308	175.27	89.98
RS8901-88X096-AMB	6000	336	308	210.18	107.91
RS8901-88X112-AMB	7000	392	308	245.10	125.83
RS8901-88X128-AMB	8000	448	308	280.01	143.76
RS8901-88X144-AMB	9000	504	308	314.93	161.68
RS8901-88X160-AMB	10000	560	308	349.85	179.61
RS8901-88X176-AMB	11000	616	308	N/A	197.53
RS8901-88X192-AMB	12000	672	308	N/A	215.45
RS8901-88X208-AMB	13000	728	308	N/A	233.38
RS8901-88X224-AMB	14000	784	308	N/A	251.30
RS8901-88X240-AMB	15000	840	308	N/A	269.23
RS8901-88X256-AMB	16000	896	308	N/A	287.15
RS6401-96X032-RED	1380	80	240	32.52	16.90
RS6401-96X048-RED	2060	120	240	48.57	25.24
RS6401-96X064-RED	2750	160	240	64.61	33.58
RS6401-96X080-RED	3430	200	240	80.66	41.92
RS6401-96X096-RED	4120	240	240	96.70	50.26
RS6401-96X112-RED	4800	280	240	112.75	58.61
RS6401-96X128-RED	5490	320	240	128.79	66.95
RS6401-96X144-RED	6170	360	240	144.84	75.29
RS6401-96X160-RED	6860	400	240	160.89	83.63
RS6401-96X176-RED	7540	440	240	N/A	91.97
RS6401-96X192-RED	8230	480	240	N/A	100.31
RS6401-96X208-RED	8910	520	240	N/A	108.65
RS6401-96X224-RED	9600	560	240	N/A	116.99
RS6401-96X240-RED	10280	600	240	N/A	125.33
RS6401-96X256-RED	10970	640	240	N/A	133.67
RS6401-96X032-AMB	1380	80	240	52.91	27.23
RS6401-96X048-AMB	2060	120	240	79.16	40.75
RS6401-96X064-AMB	2750	160	240	105.41	54.26

SIGN SECTION MODEL NUMBER	SIGN WEIGHT (lbs)	Width	Height	INPUT CURRENT @ 115V (amps)	INPUT CURRENT @ 230V (amps)
RS6401-96X080-AMB	3430	200	240	131.66	67.77
RS6401-96X096-AMB	4120	240	240	157.91	81.29
RS6401-96X112-AMB	4800	280	240	184.16	94.80
RS6401-96X128-AMB	5490	320	240	210.41	108.32
RS6401-96X144-AMB	6170	360	240	236.66	121.83
RS6401-96X160-AMB	6860	400	240	262.91	135.34
RS6401-96X176-AMB	7540	440	240	N/A	148.86
RS6401-96X192-AMB	8230	480	240	N/A	162.37
RS6401-96X208-AMB	8910	520	240	N/A	175.88
RS6401-96X224-AMB	9600	560	240	N/A	189.40
RS6401-96X240-AMB	10280	600	240	N/A	202.91
RS6401-96X256-AMB	10970	640	240	N/A	216.43
RS8901-96X032-RED	2190	112	336	53.18	27.38
RS8901-96X048-RED	3280	168	336	79.43	40.90
RS8901-96X064-RED	4370	224	336	105.68	54.41
RS8901-96X080-RED	5460	280	336	131.93	67.93
RS8901-96X096-RED	6550	336	336	158.18	81.44
RS8901-96X112-RED	7640	392	336	184.43	94.95
RS8901-96X128-RED	8730	448	336	210.68	108.47
RS8901-96X144-RED	9820	504	336	236.93	121.98
RS8901-96X160-RED	10910	560	336	263.18	135.49
RS8901-96X176-RED	12000	616	336	N/A	149.01
RS8901-96X192-RED	13090	672	336	N/A	162.52
RS8901-96X208-RED	14180	728	336	N/A	176.04
RS8901-96X224-RED	15270	784	336	N/A	189.55
RS8901-96X240-RED	16360	840	336	N/A	203.06
RS8901-96X256-RED	17450	896	336	N/A	216.58
RS8901-96X032-AMB	2190	112	336	76.87	39.47
RS8901-96X048-AMB	3280	168	336	114.96	59.02
RS8901-96X064-AMB	4370	224	336	153.05	78.58
RS8901-96X080-AMB	5460	280	336	191.14	98.13
RS8901-96X096-AMB	6550	336	336	229.23	117.69
RS8901-96X112-AMB	7640	392	336	267.32	137.24
RS8901-96X128-AMB	8730	448	336	305.41	156.79
RS8901-96X144-AMB	9820	504	336	343.50	176.35
RS8901-96X160-AMB	10910	560	336	381.59	195.90
RS8901-96X176-AMB	12000	616	336	N/A	215.45
RS8901-96X192-AMB	13090	672	336	N/A	235.01
RS8901-96X208-AMB	14180	728	336	N/A	254.56
RS8901-96X224-AMB	15270	784	336	N/A	274.12
RS8901-96X240-AMB	16360	840	336	N/A	293.67
RS8901-96X256-AMB	17450	896	336	N/A	313.22

### AC/DC wiring in cubes

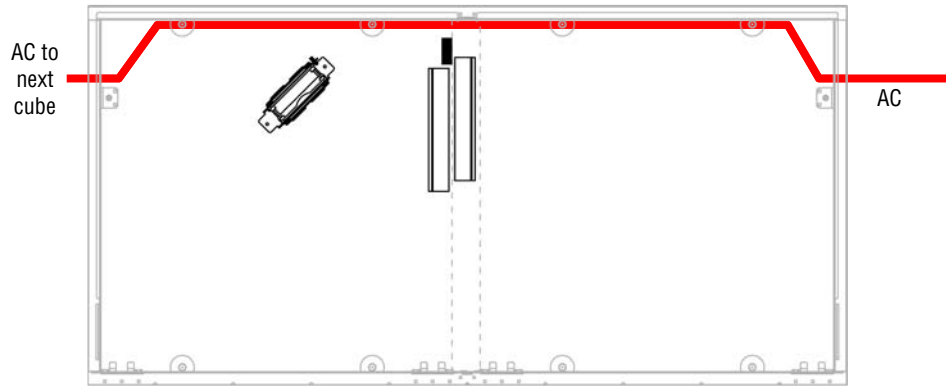


Figure 48. Ordinary cube

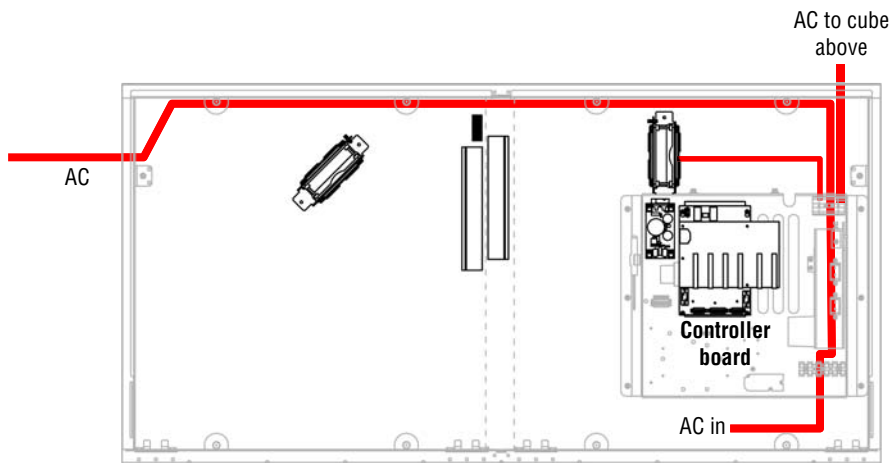


Figure 49. Control cube

### Turbo wiring in cubes

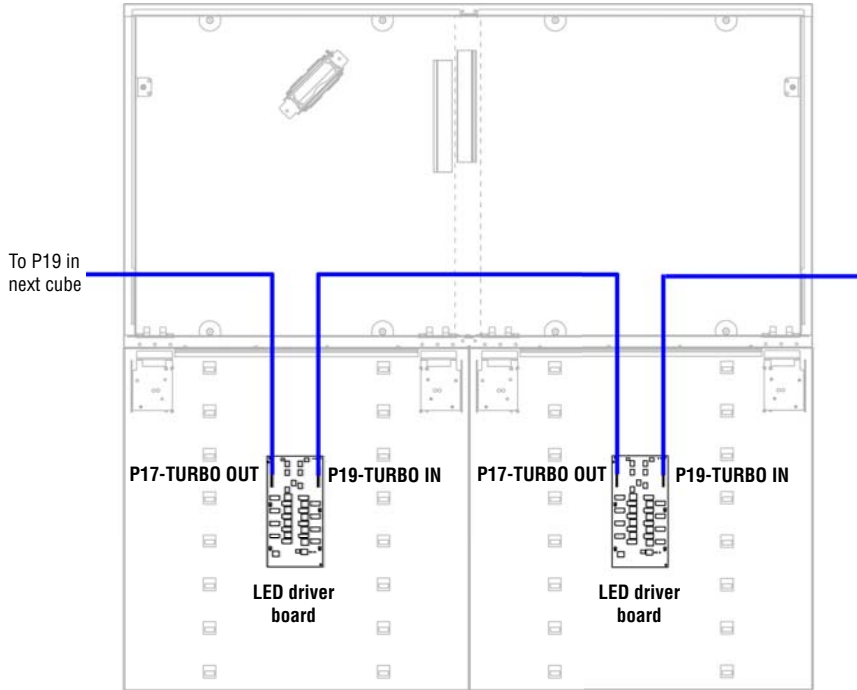


Figure 50. Ordinary cube.

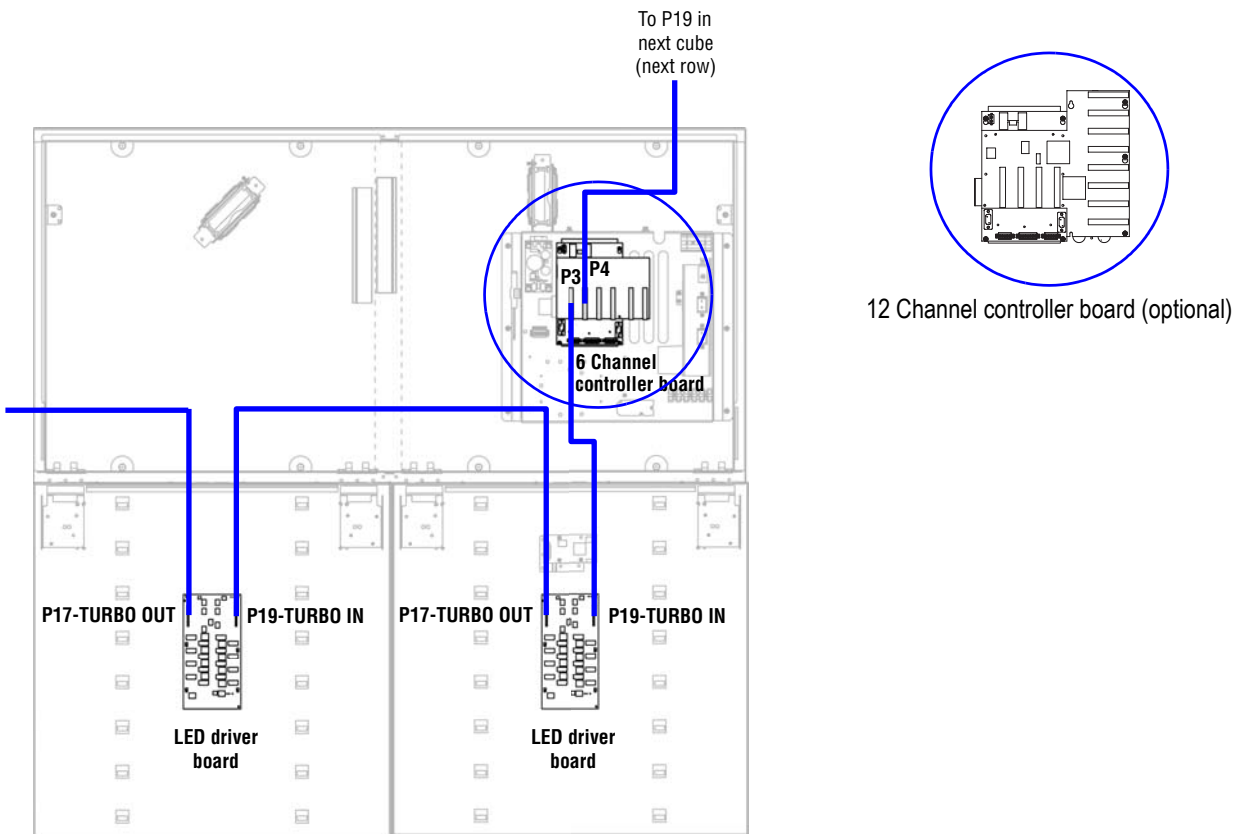
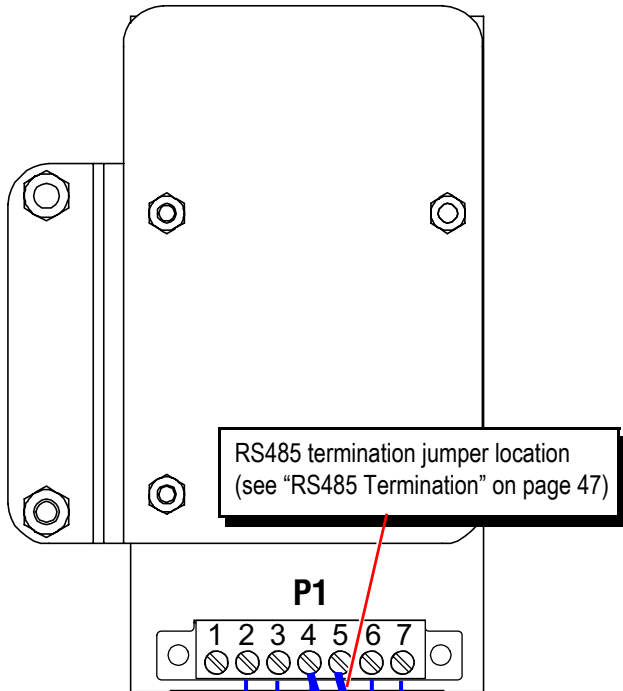


Figure 51. Control cube.

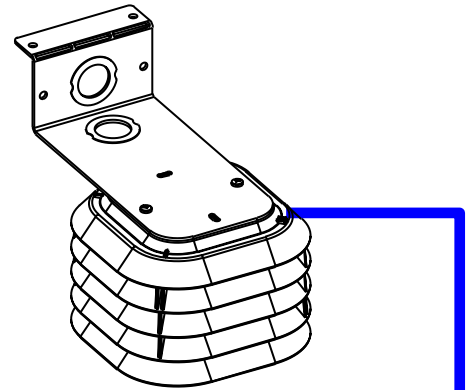
# Controller board RS232/485 wiring

## Light Sensor Board

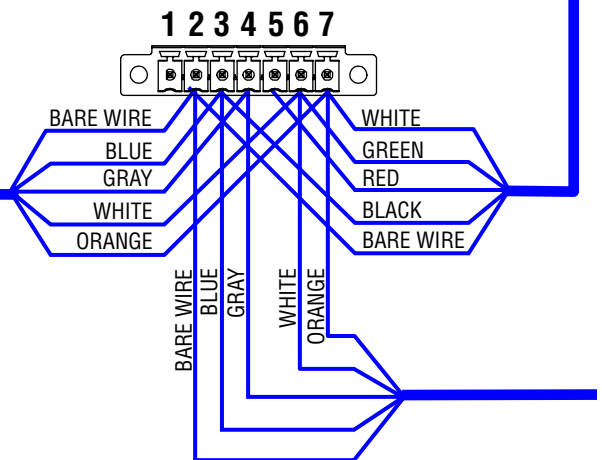


- P1**  
**pinouts:**
- 1 = nc
  - 2 = SHIELD
  - 3 = RS485A (+)
  - 4 = RS485B (-)
  - 5 = TERMINATION
  - 6 = GND
  - 7 = +5VDC

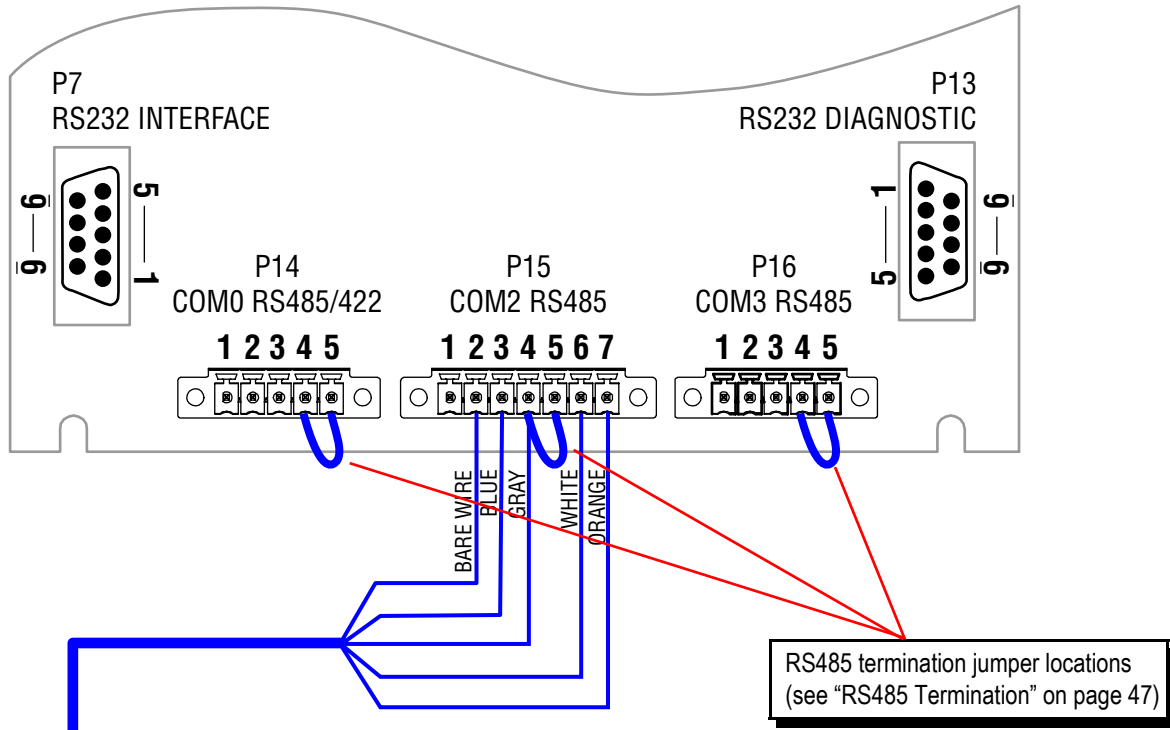
## Temperature Probe (optional)



## Wiring Terminal Block



# Controller Board

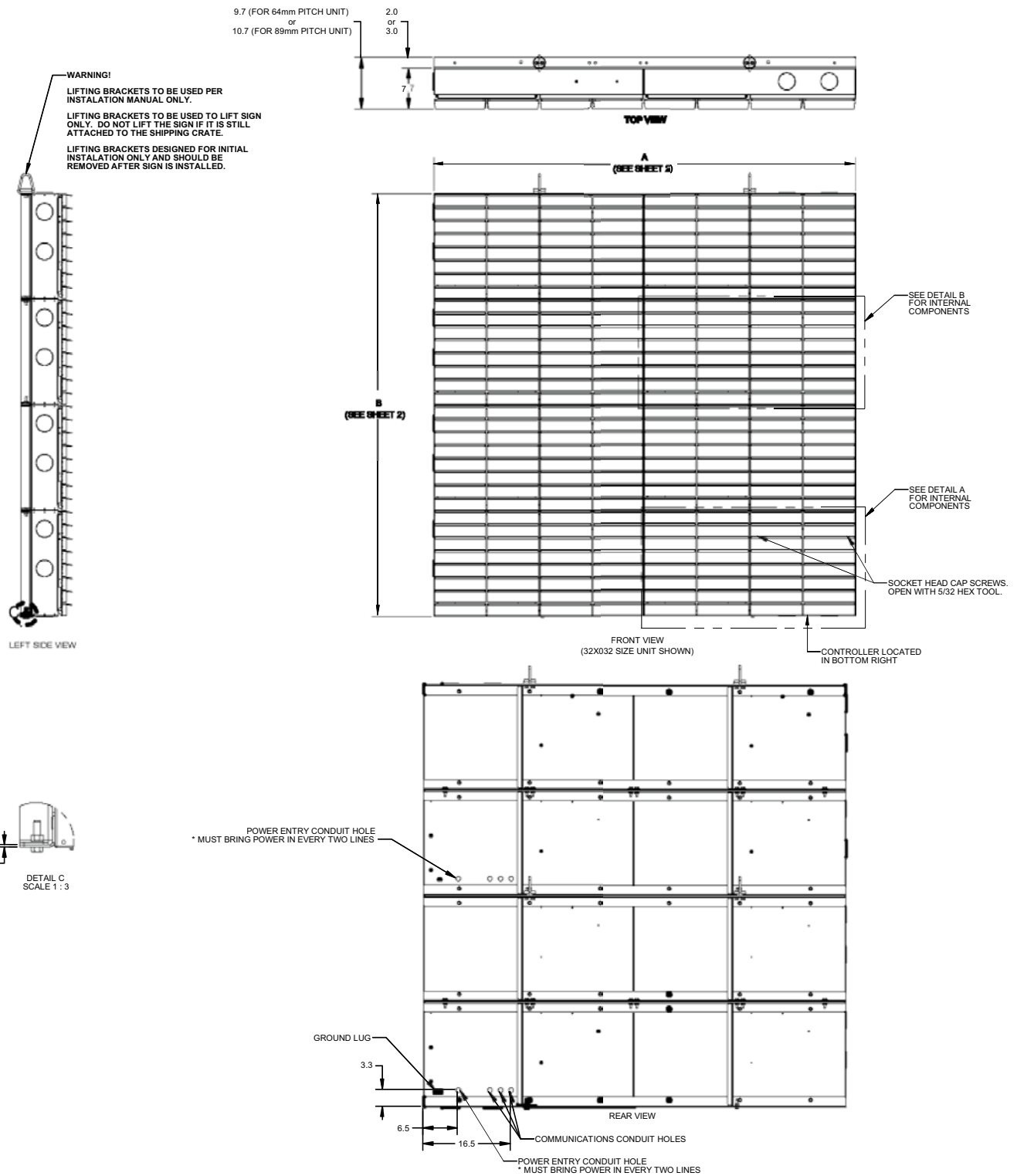


**P7 and P13 pinouts:**  
 1 = nc  
 2 = RXD  
 3 = TXD  
 4 = nc  
 5 = GND  
 6 = nc  
 7 = RTS  
 8 = CTS  
 9 = nc

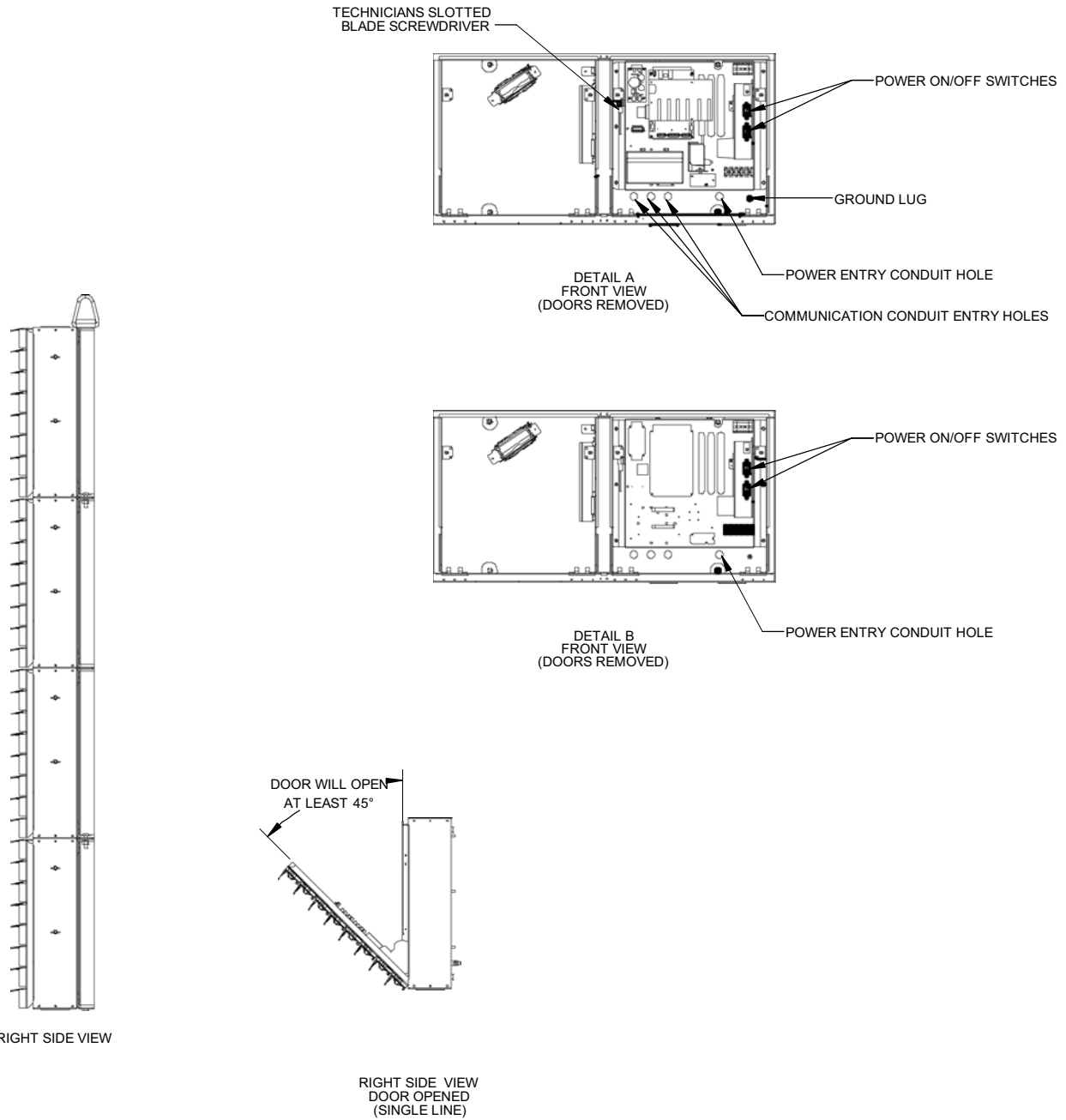
**P14 and P16 pinouts:**  
 1 = nc  
 2 = SHIELD  
 3 = RS485A (+)  
 4 = RS485B (-)  
 5 = TERMINATION

**P15 pinouts:**  
 1 = nc  
 2 = SHIELD  
 3 = RS485A (+)  
 4 = RS485B (-)  
 5 = TERMINATION  
 6 = GND  
 7 = +5VDC

# Sign dimensions (11750000-08, sheet 1 of 2)



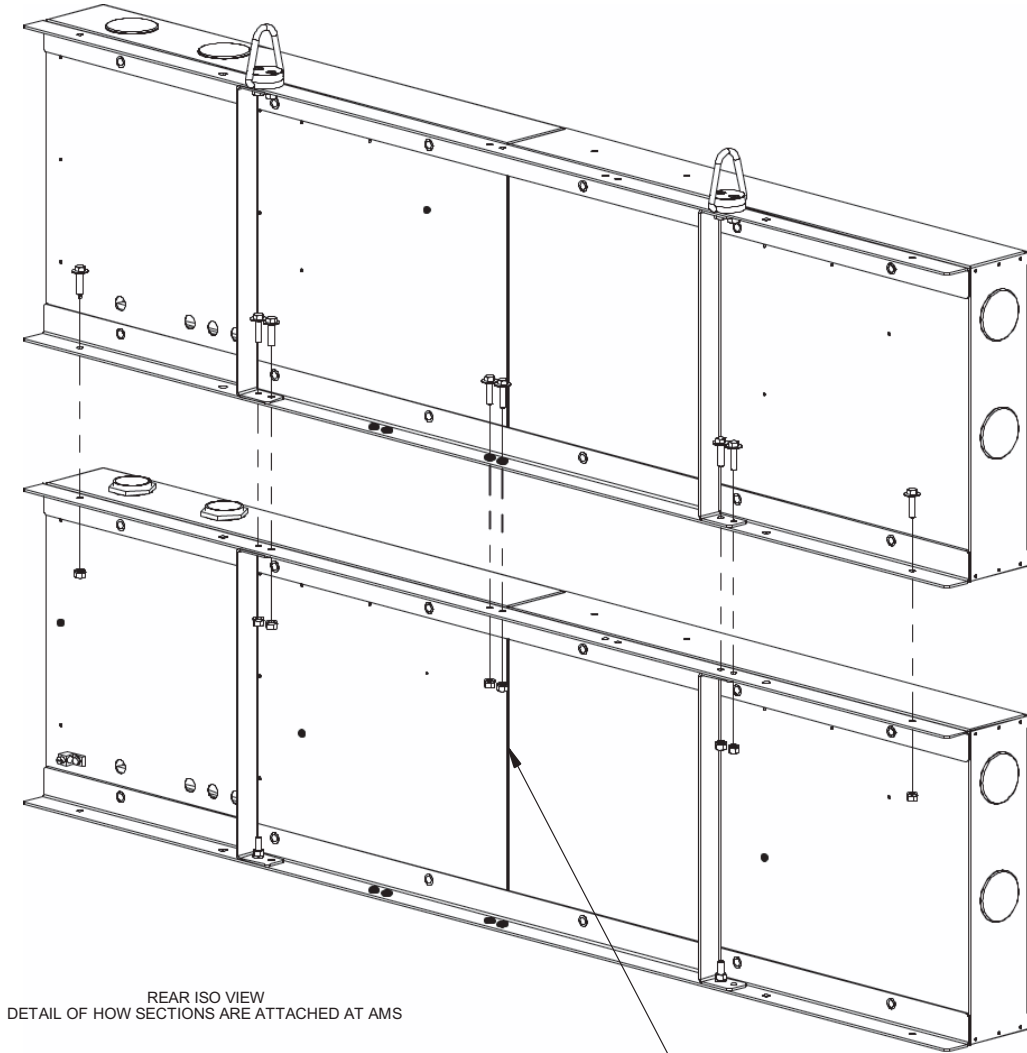




- NOTES:
- 1) REFER TO INSTALLATION MANUAL FOR ADDITIONAL INSTALLATION REQUIREMENTS.
  - 2) THE ONLY SERVICE TOOLS REQUIRED ARE A #2 PHILLIPS SCREWDRIVER, 5/32 HEX TOOL, AND A TECHNICIANS SLOTTED BLADE SCREWDRIVER (PROVIDED).
  - 3) REMOVAL OF ANY FASTENERS OR OTHER NOTED PARTS WILL NEGATE THE PRODUCT WARRANTY.
  - 4) ALL FASTENERS ARE ANSI INCH.
  - 5) USE ONLY TOP AND BOTTOM ANGLE OR VERTICAL ANGLES TO MOUNT SIGN DIRECTLY TO SUPERSTRUCTURE. ALL INSTALLATIONS, SUPERSTRUCTURE DESIGNS, AND CONNECTIONS MUST BE DESIGNED/APPROVED BY A QUALIFIED STRUCTURAL ENGINEER. CALL ADAPTIVE MICRO SYSTEMS AT 1-800-558-7022 FOR STRUCTURAL ENGINEERING CONSULTANT CONTACT INFORMATION.
  - 6) DUE TO STRENGTH LIMITATION OF DISPLAY SUBSTRUCTURE, LARGER SIGNS WILL REQUIRE MULTIPLE DISPLAY SECTIONS. DISPLAY SECTION SIZE WILL BE OPTIMIZED FOR PRODUCTION YIELD AND MAY VARY WITH EACH SIGN.
  - 7) DESIGN AND DIMENSIONS ARE SUBJECT TO CHANGE WITHOUT NOTICE.

### Sign dimensions (11750000-08, revision A, sheet 2 of 2)

ALL SIGNS AND SIGN SECTIONS MUST BE MOUNTED TO SUPERSTRUCTURE.  
ALL INSTALATIONS, SUPERSTRUCTURE DESIGNS, AND CONNECTIONS MUST  
BE DESIGNED/APPROVED BY A QUALIFIED STRUCTURAL ENGINEER.  
CALL ADAPTIVE MICRO SYSTEMS AT 800.558.7022 FOR STRUCTURAL  
ENGINNERING CONSULTANT CONTACT INFORMATION.

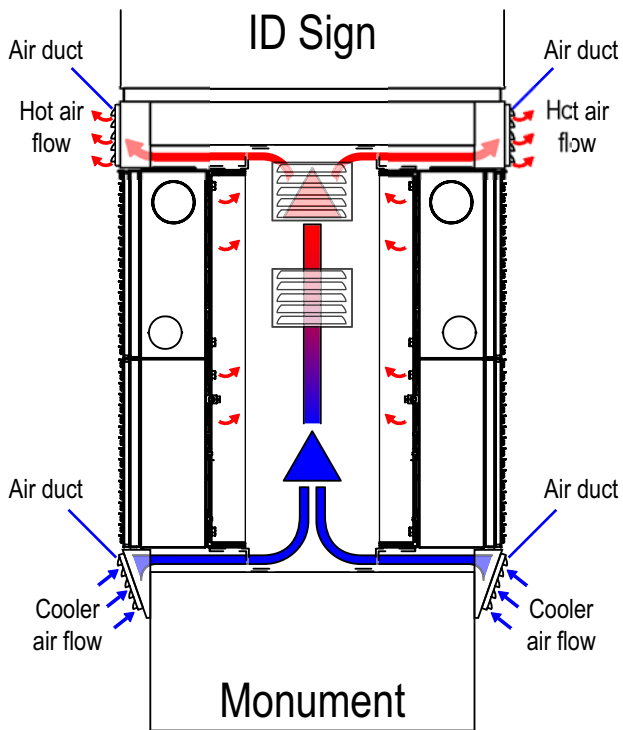


REAR ISO VIEW  
DETAIL OF HOW SECTIONS ARE ATTACHED AT AMS

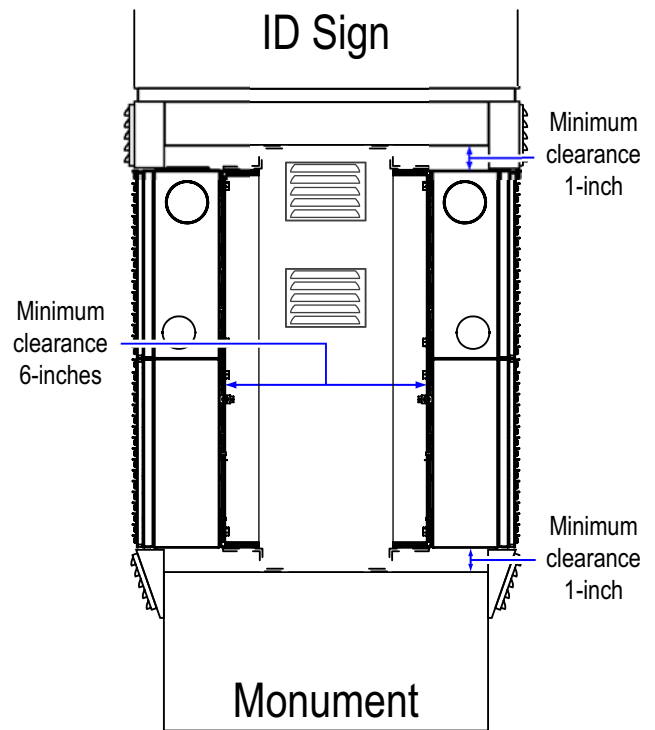
INSTALL GROMMETS (PROVIDED) BETWEEN SIGN SECTIONS.  
ALL DATA AND POWER CABLES MUST BE ROUTED THROUGH  
THE GROMMETS. POWER AND DATA CABLES MUST BE ROUTED  
THROUGH DIFFERENT HOLES. POWER AND FIBER OPTIC CAN BE  
ROUTED THROUGH THE SAME HOLE IF NECESSARY.

### Ventilation diagram for back-to-back sign configurations

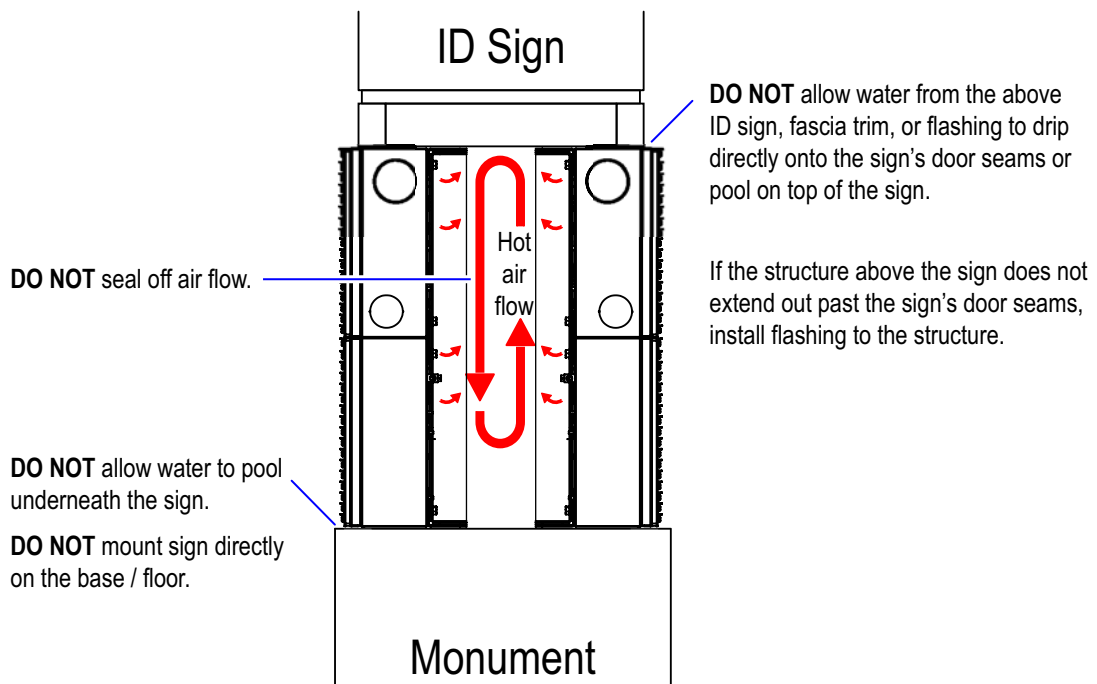
*Recommended method*



*Clearance requirements*



*Follow these guidelines or sign warranty will be void:*



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# Appendix B

## AlphaNet connectivity diagrams

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The diagrams on the following pages illustrate the set-up for the following AlphaNet connectivity options:

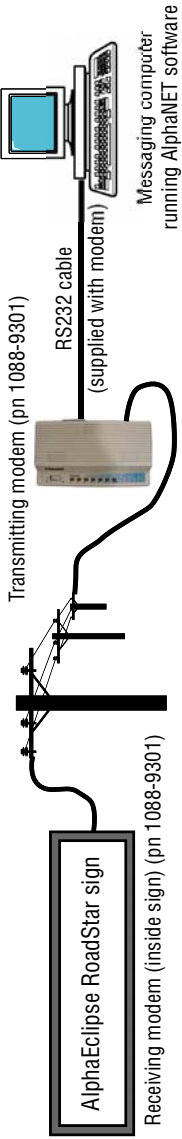
- “120V Modem connection diagram” on page 70.
- “230V Modem connection diagram” on page 71.
- “Converter box III connection diagram” on page 72.
- “Fiber optic connection diagram” on page 73.
- “Wireless transceiver connection diagram” on page 74.

# 120V Modem connection diagram

## AlphaEclipse RoadStar sign

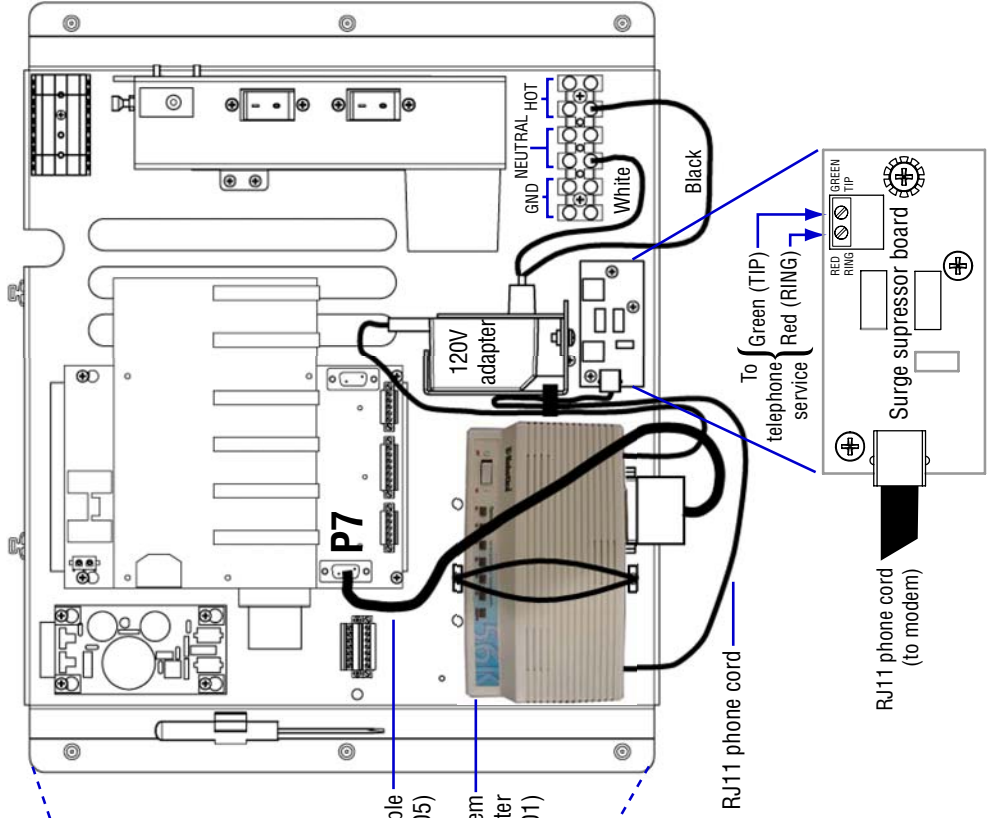
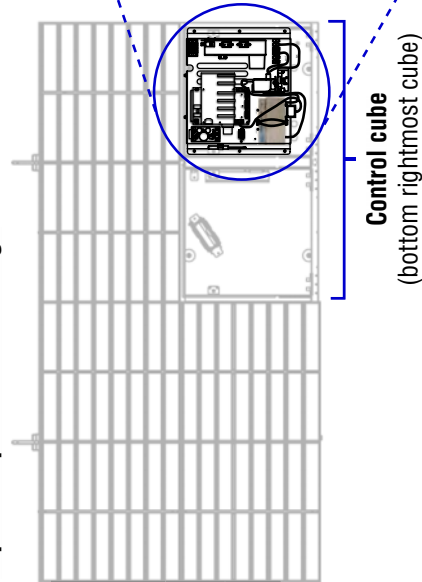
In order to display messages on a sign, the messaging computer must be connected to the sign, such as with a pair of telephone modems (a Transmitting modem attached to the messaging computer and a Receiving modem attached to a sign).  
 Modems can connect to a sign that is almost anywhere. However, a sign must have its own phone line.

## 120V modem computer -to-sign connection

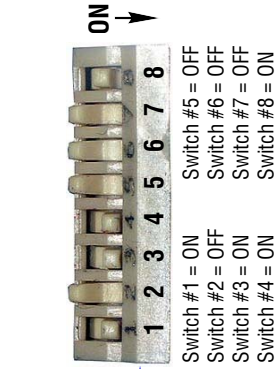


### Overview

## AlphaEclipse RoadStar sign



### Modem DIP switch settings:



### Modem AT command setup string:

AT&H0&R1&B1&N6&Y0&W0

DRAWING REVISION 1

### Wiring

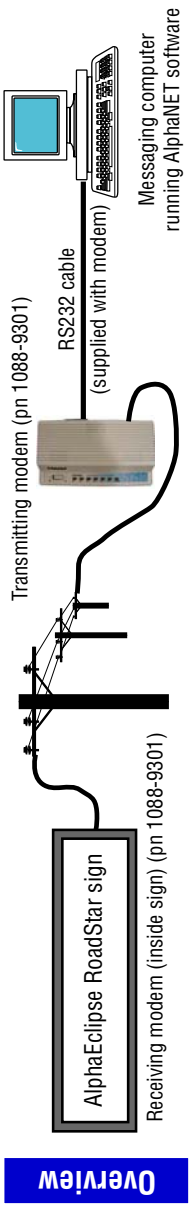
# 230V Modem connection diagram

## AlphaEclipse RoadStar sign

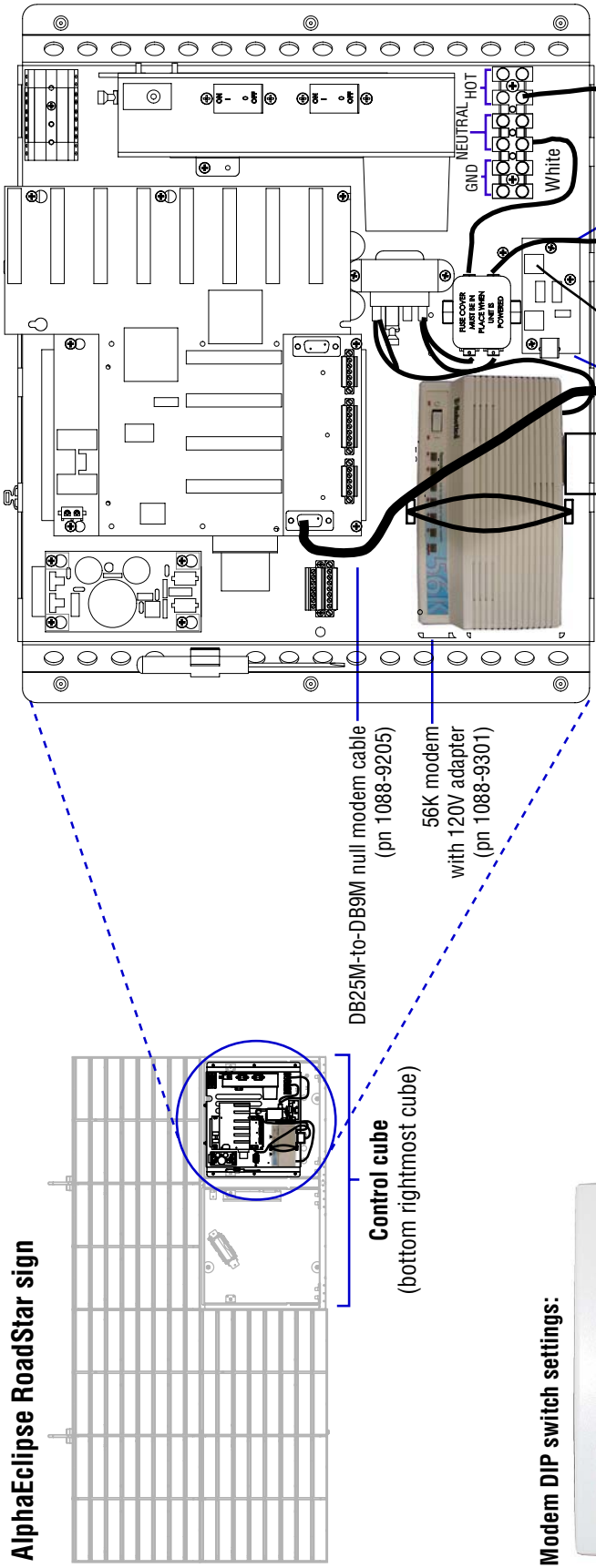
In order to display messages on a sign, the messaging computer must be connected to the sign, such as with a pair of telephone modems (a Transmitting modem attached to the messaging computer and a Receiving modem attached to a sign).

Modems can connect to a sign that is almost anywhere. However, a sign must have its own phone line.

## 230V modem computer -to-sign connection

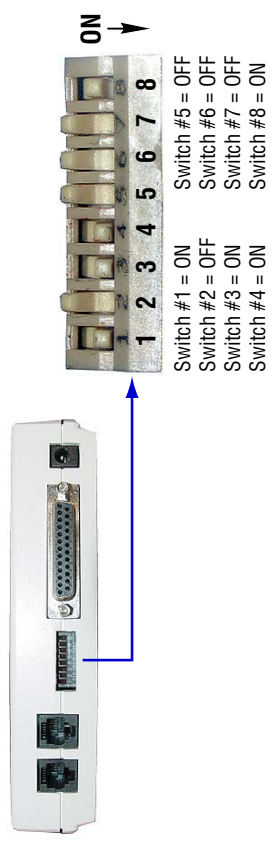


## AlphaEclipse RoadStar sign



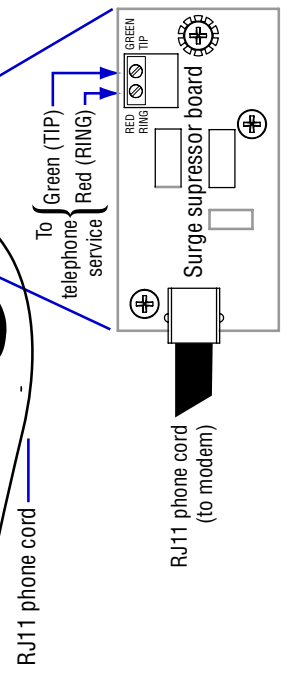
## Wiring

### Modem DIP switch settings:



### Modem AT command setup string:

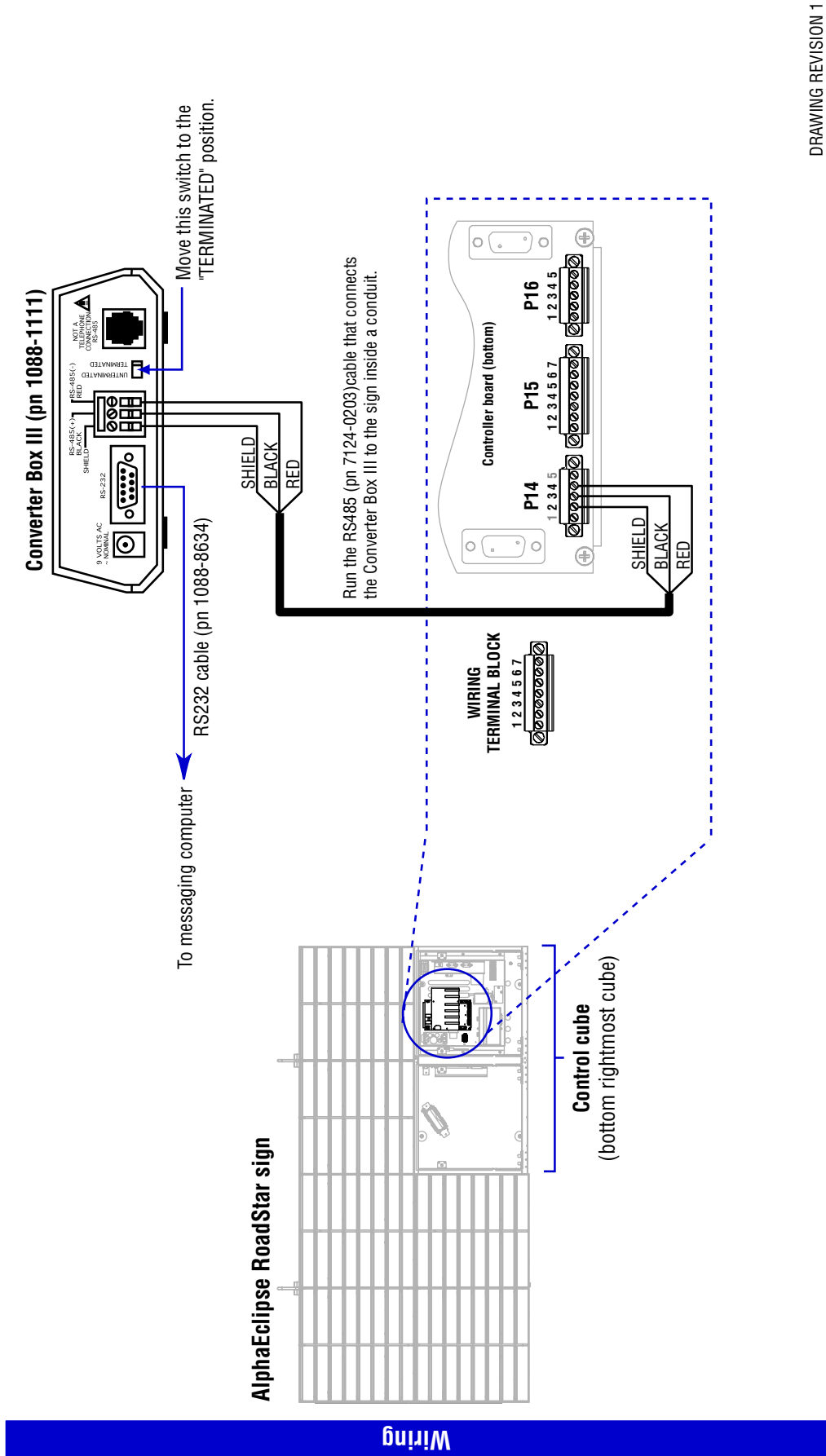
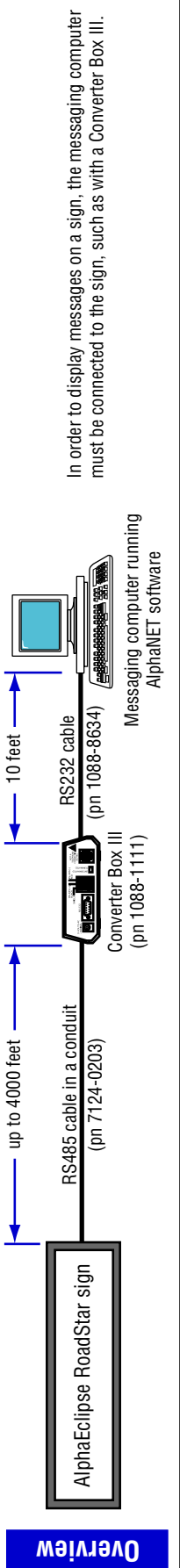
AT&H0&R1&B1&N6&Y0&W0



DRAWING REVISION 1

# Converter box III connection diagram

## AlphaEclipse RoadStar sign



DRAWING REVISION 1



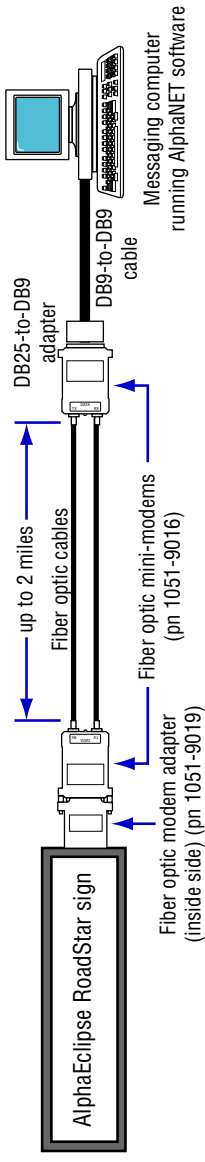
# Fiber optic connection diagram

## AlphaEclipse RoadStar sign

In order to display messages on a sign, the messaging computer must be connected to the sign, such as with fiber optic modems.

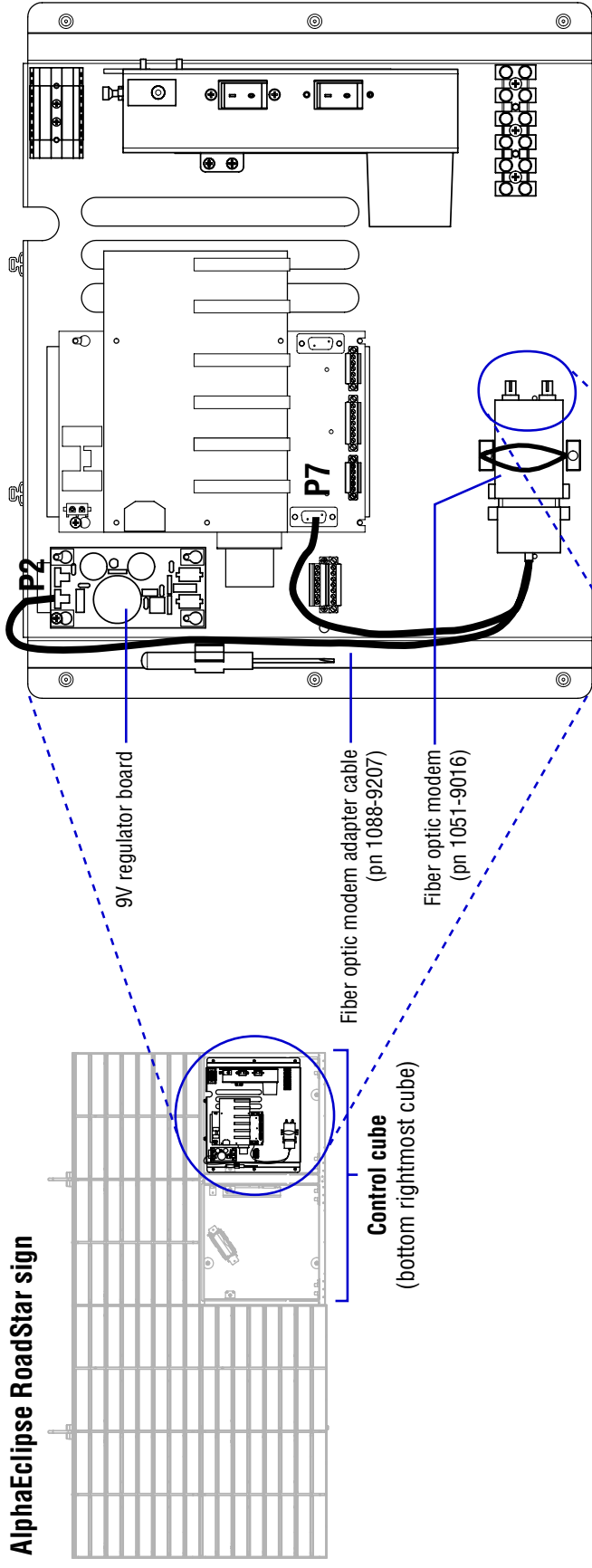
Fiber optic modems allow the messaging computer to connect to a sign up to 2 miles away from the computer. The fiber optic modems send data to a sign over an optical RS232 connection.

## Fiber optic computer-to-sign connection

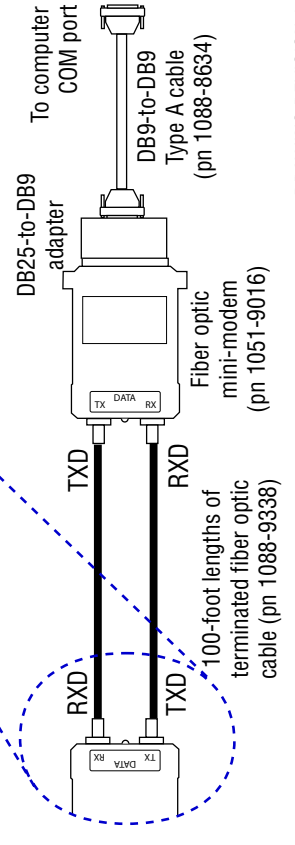


### Overview

## AlphaEclipse RoadStar sign



### Wiring



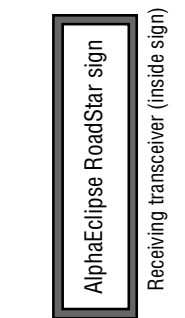
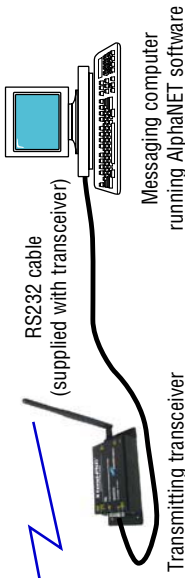
DRAWING REVISION 1

# Wireless transceiver connection diagram

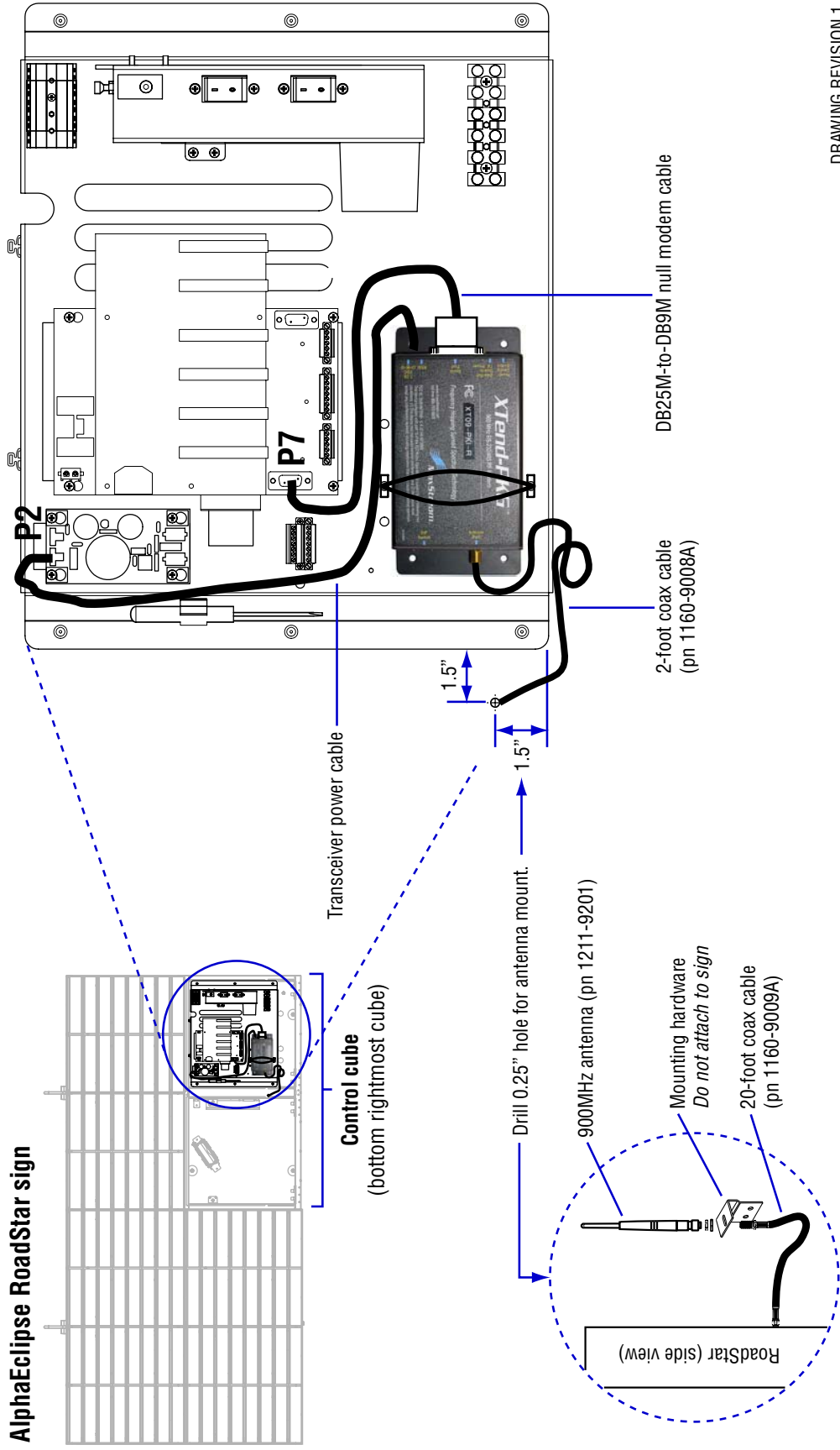
## Wireless computer-to-sign connection (MaxStream XTend 900MHz Transceiver) AlphaEclipse RoadStar sign

In order to display messages on a sign, the messaging computer must be connected to the sign, such as with a pair of wireless transceivers (a transmitting transceiver attached to the messaging computer and a receiving transceiver attached to a sign).

At 9600 baud, MaxStream XTend transceivers have an indoor transmission range of up to 3000 feet and an outdoor range of up to 40 miles line-of-site.



### Overview



### Wiring

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