



Solar Powered LED Guidance Signs  
L-858Y/R/L/B(L)

## User Manual

96A0492, Rev. B, 2022/07/12





## A.0 Disclaimer / Standard Warranty

### CE certification

The equipment listed as CE certified means that the product complies with the essential requirements concerning safety and hygiene. The European directives that have been taken into consideration in the design are available on written request to ADB SAFEGATE.

### ETL certification

The equipment listed as ETL certified means that the product complies with the essential requirements concerning safety and FAA Airfield regulations. The FAA directives that have been taken into consideration in the design are available on written request to ADB SAFEGATE.

### All Products Guarantee

ADB SAFEGATE will correct by repair or replacement per the applicable guarantee above, at its option, equipment or parts which fail because of mechanical, electrical or physical defects, provided that the goods have been properly handled and stored prior to installation, properly installed and properly operated after installation, and provided further that Buyer gives ADB SAFEGATE written notice of such defects after delivery of the goods to Buyer. Refer to the Safety section for more information on Material Handling Precautions and Storage precautions that must be followed.

ADB SAFEGATE reserves the right to examine goods upon which a claim is made. Said goods must be presented in the same condition as when the defect therein was discovered. ADB SAFEGATE further reserves the right to require the return of such goods to establish any claim.

ADB SAFEGATE's obligation under this guarantee is limited to making repair or replacement within a reasonable time after receipt of such written notice and does not include any other costs such as the cost of removal of defective part, installation of repaired product, labor or consequential damages of any kind, the exclusive remedy being to require such new parts to be furnished.

ADB SAFEGATE's liability under no circumstances will exceed the contract price of goods claimed to be defective. Any returns under this guarantee are to be on a transportation charges prepaid basis. For products not manufactured by, but sold by ADB SAFEGATE, warranty is limited to that extended by the original manufacturer. This is ADB SAFEGATE's sole guarantee and warranty with respect to the goods; there are no express warranties or warranties of fitness for any particular purpose or any implied warranties of fitness for any particular purpose or any implied warranties other than those made expressly herein. All such warranties being expressly disclaimed.

### Standard Products Guarantee

Products manufactured by ADB SAFEGATE are guaranteed against mechanical, electrical, and physical defects (excluding lamps) which may occur during proper and normal use for a period of two years from the date of ex-works delivery, and are guaranteed to be merchantable and fit for the ordinary purposes for which such products are made.



### Note

See your sales order contract for a complete warranty description.

Replaced or repaired equipment under warranty falls into the warranty of the original delivery. No new warranty period is started for these replaced or repaired products.

### FAA Certified products manufactured by ADB SAFEGATE

ADB SAFEGATE L858 Airfield Guidance Signs are warranted against mechanical and physical defects in design or manufacture for a period of 2 years from date of installation, per FAA AC 150/5345-44 (applicable edition).

ADB SAFEGATE LED products (with the exception of obstruction lighting) are warranted against electrical defects in design or manufacture of the LED or LED specific circuitry for a period of 4 years from date of installation, per FAA EB67 (applicable edition). These FAA certified constant current (series) powered LED products must be installed, interfaced and powered with and through products certified under the FAA Airfield Lighting Equipment Program (ALECP) to be included in this 4 (four) year warranty. This includes, but is not limited to, interface with products such as Base Cans, Isolation Transformers, Connectors, Wiring, and Constant Current Regulators.



## Note

See your sales order contract for a complete warranty description.

Replaced or repaired equipment under warranty falls into the warranty of the original delivery. No new warranty period is started for these replaced or repaired products.

---

## Liability

---



### WARNING

Use of the equipment in ways other than described in the catalog leaflet and the manual may result in personal injury, death, or property and equipment damage. Use this equipment only as described in the manual.

---

ADB SAFEGATE cannot be held responsible for injuries or damages resulting from non-standard, unintended uses of its equipment. The equipment is designed and intended only for the purpose described in the manual. Uses not described in the manual are considered unintended uses and may result in serious personal injury, death or property damage.

Unintended uses, includes the following actions:

- Making changes to equipment that have not been recommended or described in this manual or using parts that are not genuine ADB SAFEGATE replacement parts or accessories.
- Failing to make sure that auxiliary equipment complies with approval agency requirements, local codes, and all applicable safety standards if not in contradiction with the general rules.
- Using materials or auxiliary equipment that are inappropriate or incompatible with your ADB SAFEGATE equipment.
- Allowing unskilled personnel to perform any task on or with the equipment.

## © ADB SAFEGATE BV

This manual or parts thereof may not be reproduced, stored in a retrieval system, or transmitted, in any form or by any means, electronic, mechanical, photocopying, recording, nor otherwise, without ADB SAFEGATE BV's prior written consent.

This manual could contain technical inaccuracies or typographical errors. ADB SAFEGATE BV reserves the right to revise this manual from time to time in the contents thereof without obligation of ADB SAFEGATE BV to notify any person of such revision or change. Details and values given in this manual are average values and have been compiled with care. They are not binding, however, and ADB SAFEGATE BV disclaims any liability for damages or detriments suffered as a result of reliance on the information given herein or the use of products, processes or equipment to which this manual refers. No warranty is made that the use of the information or of the products, processes or equipment to which this manual refers will not infringe any third party's patents or rights. The information given does not release the buyer from making their own experiments and tests.

# TABLE OF CONTENTS

<b>1.0 Safety</b> .....	<b>1</b>
1.1 Safety Messages .....	1
1.1.1 Introduction to Safety .....	2
1.1.2 Intended Use .....	2
1.1.3 Material Handling Precautions: Storage .....	3
1.1.4 Operation Safety .....	3
1.1.5 Maintenance Safety .....	3
1.1.6 Material Handling Precautions, ESD .....	4
<b>2.0 Introduction</b> .....	<b>5</b>
2.1 Features .....	5
2.2 General Information .....	6
2.2.1 Compliance with Standards .....	6
2.2.2 Uses .....	6
2.2.3 Sign Legends .....	6
2.2.4 Construction .....	6
2.2.5 Operating Conditions .....	6
2.2.6 Equipment Data .....	6
2.2.7 Sign Dimensions and Weights .....	8
2.2.8 Solar Panel Orientation .....	8
2.2.9 Solar Panel Tilt Angles .....	9
2.2.10 Equipment Storage .....	9
2.3 Wireless Hand-Held Controller .....	9
2.3.1 Features .....	10
<b>3.0 Installation</b> .....	<b>11</b>
3.1 Unpacking .....	12
3.2 General Guidelines .....	13
3.2.1 Overall Mounting Height .....	13
3.2.2 Sign Orientation .....	13
3.2.3 Sign Distance from Pavement Edge .....	13
3.2.4 Sign Installation on a Concrete Pad .....	13
3.2.5 Sign Mounting .....	14
3.2.6 Earth Ground Lug .....	15
3.2.7 Sign Frangible Coupling Installation .....	15
3.2.8 Sign Tethers .....	16
3.3 SEPS Installation .....	17
3.3.1 Site Preparation .....	17
3.3.2 Assembly .....	17
3.3.3 Antenna Assembly .....	19
3.3.4 Grounding .....	20
3.3.5 Wiring .....	20
3.3.6 Connect Load .....	21
3.3.7 Install Battery .....	28
<b>4.0 Maintenance and Repair</b> .....	<b>31</b>
4.1 Replacing an LED Light Bar .....	31
4.2 Replacing the Battery .....	35
4.2.1 Energy Management System (EMS) Recycling .....	37
4.3 Troubleshooting .....	37
<b>5.0 Parts/Ordering Codes</b> .....	<b>39</b>
5.1 Spare Parts .....	41



# List of Figures

Figure 1: Solar Panel Tilt Angle Map .....	9
Figure 2: Example of Hilti Kwik Bolt 3 Standard Thread 304 Stainless Steel .....	14
Figure 3: 2-Bolt Mounting Flange for Mode 2 and Mode 3 Size 1 Signs, for Mode 2 Size 2, 3, 4 and 5 Signs. Part Number 62A2142 .....	14
Figure 4: 4-Bolt Mounting Flange for Mode 3 Size 2, 3, 4, 5 Signs. Part Number 62A2146 .....	14
Figure 5: Sign Frangible Coupling and Mounting Flange Assembly .....	15
Figure 6: Installing the Sign Tether .....	16
Figure 7: Mounting Template for SEPS Installation .....	17
Figure 8: Solar Sign Terminal Block .....	21
Figure 9: SEPS Load Cable .....	22
Figure 10: Wiring a 1 Module Sign (Size 1, 2, 3, or 5) .....	23
Figure 11: Wiring a 1 Module Sign (Size 4) .....	23
Figure 12: Wiring a 2 Module Sign (Size 1) .....	24
Figure 13: Wiring Terminal Block Channel A Only .....	24
Figure 14: Wiring a 2 Module Sign (Size 2 or 3) .....	25
Figure 15: Wiring a 3 Module Sign (Size 1) .....	25
Figure 16: Wiring a 3 Module Sign (Size 2 or 3) .....	26
Figure 17: Wiring a 4 Module Sign (Size 1) .....	26
Figure 18: Wiring a 4 Module Sign (Size 2 or 3) .....	27
Figure 19: Wiring Terminal Block Channel A and B .....	27
Figure 20: Three Sizes of Light Bars 48A0442/XX .....	32
Figure 21: LED Light Bar Circuit Resistor Assembly 44A6921/5 .....	32
Figure 22: Wiring Diagram for the LED Light Bars 1 Module and 2 Module Signs .....	33
Figure 23: Wiring Diagram for the LED Light Bars 3 Module and 4 Module Signs .....	34
Figure 24: Solar Sign Parts .....	41





## List of Tables

Table 1: Specifications .....	6
Table 2: Recommended Sign Distance from Pavement Edge .....	13
Table 3: LED Taxiway and Runway Sign Maintenance .....	31
Table 4: Troubleshooting Guide .....	37
Table 5: Parts .....	41



# 1.0 Safety

## Introduction to Safety

This section contains general safety instructions for installing and using ADB SAFEGATE equipment. Some safety instructions may not apply to the equipment in this manual. Task- and equipment-specific warnings are included in other sections of this manual where appropriate.

## 1.1 Safety Messages

### HAZARD Icons used in the manual

For all HAZARD symbols in use, see the Safety section. All symbols must comply with ISO and ANSI standards.

Carefully read and observe all safety instructions in this manual, which alert you to safety hazards and conditions that may result in personal injury, death or property and equipment damage and are accompanied by the symbol shown below.



**WARNING**

Failure to observe a warning may result in personal injury, death or equipment damage.



**DANGER - Risk of electrical shock or ARC FLASH**

Disconnect equipment from line voltage. Failure to observe this warning may result in personal injury, death, or equipment damage. ARC Flash may cause blindness, severe burns or death.



**WARNING - Wear personal protective equipment**

Failure to observe may result in serious injury.



**WARNING - Do not touch**

Failure to observe this warning may result in personal injury, death, or equipment damage.



**CAUTION**

Failure to observe a caution may result in equipment damage.

### Qualified Personnel



**Important Information**

The term **qualified personnel** is defined here as individuals who thoroughly understand the equipment and its safe operation, maintenance and repair. Qualified personnel are physically capable of performing the required tasks, familiar with all relevant safety rules and regulations and have been trained to safely install, operate, maintain and repair the equipment. It is the responsibility of the company operating this equipment to ensure that its personnel meet these requirements.

Always use required personal protective equipment (PPE) and follow safe electrical work practice.

### 1.1.1 Introduction to Safety



#### CAUTION

##### Unsafe Equipment Use

This equipment may contain electrostatic devices, hazardous voltages and sharp edges on components

- Read installation instructions in their entirety before starting installation.
- Become familiar with the general safety instructions in this section of the manual before installing, operating, maintaining or repairing this equipment.
- Read and carefully follow the instructions throughout this manual for performing specific tasks and working with specific equipment.
- Make this manual available to personnel installing, operating, maintaining or repairing this equipment.
- Follow all applicable safety procedures required by your company, industry standards and government or other regulatory agencies.
- Install all electrical connections to local code.
- Use only electrical wire of sufficient gauge and insulation to handle the rated current demand. All wiring must meet local codes.
- Route electrical wiring along a protected path. Make sure they will not be damaged by moving equipment.
- Protect components from damage, wear, and harsh environment conditions.
- Allow ample room for maintenance, panel accessibility, and cover removal.
- Protect equipment with safety devices as specified by applicable safety regulations
- If safety devices must be removed for installation, install them immediately after the work is completed and check them for proper functioning prior to returning power to the circuit.

**Failure to follow this instruction can result in serious injury or equipment damage**

### Additional Reference Materials



#### Important Information

- IEC - International Standards and Conformity Assessment for all electrical, electronic and related technologies.
- IEC 60364 - Electrical Installations in Buildings.
- FAA Advisory: AC 150/5340-26 (current edition), Maintenance of Airport Visual Aid Facilities.
- Maintenance personnel must refer to the maintenance procedure described in the ICAO Airport Services Manual, Part 9.
- ANSI/NFPA 79, Electrical Standards for Metalworking Machine Tools.
- National and local electrical codes and standards.

### 1.1.2 Intended Use



#### CAUTION

##### Use this equipment as intended by the manufacturer

This equipment is designed to perform a specific function, do not use this equipment for other purposes

- Using this equipment in ways other than described in this manual may result in personal injury, death or property and equipment damage. Use this equipment only as described in this manual.

**Failure to follow this instruction can result in serious injury or equipment damage**

### 1.1.3 Material Handling Precautions: Storage



#### CAUTION

##### Improper Storage

Store this equipment properly

- If equipment is to be stored prior to installation, it must be protected from the weather and kept free of condensation and dust.

**Failure to follow this instruction can result in equipment damage**

### 1.1.4 Operation Safety



#### CAUTION

##### Improper Operation

Do Not Operate this equipment other than as specified by the manufacturer

- Only qualified personnel, physically capable of operating the equipment and with no impairments in their judgment or reaction times, should operate this equipment.
- Read all system component manuals before operating this equipment. A thorough understanding of system components and their operation will help you operate the system safely and efficiently.
- Before starting this equipment, check all safety interlocks, fire-detection systems, and protective devices such as panels and covers. Make sure all devices are fully functional. Do not operate the system if these devices are not working properly. Do not deactivate or bypass automatic safety interlocks or locked-out electrical disconnects or pneumatic valves.
- Protect equipment with safety devices as specified by applicable safety regulations.
- If safety devices must be removed for installation, install them immediately after the work is completed and check them for proper functioning.
- Route electrical wiring along a protected path. Make sure they will not be damaged by moving equipment.
- Never operate equipment with a known malfunction.
- Do not attempt to operate or service electrical equipment if standing water is present.
- Use this equipment only in the environments for which it is rated. Do not operate this equipment in humid, flammable, or explosive environments unless it has been rated for safe operation in these environments.
- Never touch exposed electrical connections on equipment while the power is ON.

**Failure to follow these instructions can result in equipment damage**

### 1.1.5 Maintenance Safety



#### DANGER

##### Electric Shock Hazard

This equipment may contain electrostatic devices

- Do not operate a system that contains malfunctioning components. If a component malfunctions, turn the system OFF immediately.
- Disconnect and lock out electrical power.
- Allow only qualified personnel to make repairs. Repair or replace the malfunctioning component according to instructions provided in its manual.

**Failure to follow these instructions can result in death or equipment damage**

### 1.1.6 Material Handling Precautions, ESD



#### CAUTION

##### **Electrostatic Sensitive Devices**

This equipment may contain electrostatic devices

- Protect from electrostatic discharge.
- Electronic modules and components should be touched only when this is unavoidable e.g. soldering, replacement.
- Before touching any component of the cabinet you shall bring your body to the same potential as the cabinet by touching a conductive earthed part of the cabinet.
- Electronic modules or components must not be brought in contact with highly insulating materials such as plastic sheets, synthetic fiber clothing. They must be laid down on conductive surfaces.
- The tip of the soldering iron must be grounded.
- Electronic modules and components must be stored and transported in conductive packing.

**Failure to follow this instruction can result in equipment damage**

## 2.0 Introduction

The L-858(L) LED solar signs, designed for the FAA market, virtually eliminate runway shutdowns due to the longevity of the LED light source. They are direct replacements for existing signs, and they create a highly uniform distribution of light, eliminating hot spots and shadows.

The ADB Safegate solar systems are an ideal choice for an airfield that requires improved safety measures, but experiences difficulties with grid access. The LED Solar Sign System (SSS) is powered using a Solar Engine Power Supply (SEPS). The solar system is designed with the latest solar technology, hardware, and software to provide power and control to the lights or signs.

The Sign SEPS powers up to two channels of airfield sign LED light bars at a fixed drive current of 162 mA each channel. The LED output is turned on from dusk to dawn each night based on solar panel solar detection. The number of SEPS required to power the sign is determined by the sign size as well as the number of sign modules.

One SEPS is required to power: (size 1 signs with 1, 2, 3, or 4 modules), (size 2 and 3 with 1 or 2 modules), (size 4 and 5 with 1 module). Two SEPS are required to power: (size 2 and 3 signs with 3 or 4 modules).

The SEPS is available in a wireless version that can be controlled using Flash Technology's Wireless Hand-Held Controller. Wireless control allows on-demand off and on control of the LEDs.



### 2.1 Features

- A green solution for a clean, renewable, and reliable energy source with the lightest environmental footprint
- LED light source virtually eliminates runway shutdowns due to the long life and reliability of LED technology
- Direct replacement for existing sign
- Creates a highly uniform distribution of light, eliminating hot spots and shadows
- Operates on solar energy
- Eliminates re-lamping expenses and reduces on-going maintenance costs
- Installs in minutes with no trenching, cabling, or external power, and can be relocated just as quickly
- High-efficiency monocrystalline solar panel
- High-quality rechargeable deep-cycle battery
- Easy installation and relocation
- Immediate operation upon installation
- Engineered for consistent operation and reliable performance
- The Energy Management System (EMS) monitors and adapts to environmental conditions
- Long life expectancy under tough conditions
- Minimum autonomy operation (without solar charging) 7+ days
- Available with 900 MHz or 2.4 GHz communication
- Seamless integration with Flash Technology wireless controller products

## 2.2 General Information

### 2.2.1 Compliance with Standards

**FAA:** Designed to meet L-858Y(L), L-858R(L), L-858L(L), and L-858B(L) AC 150/5345-44 (Current Edition) and Engineering Brief No. 67.

**CE:** Complies with the requirements of the EMC Directive 2004/108/EC.

### 2.2.2 Uses

- L-858Y(L): Direction, Destination, and Boundary (Informational Sign)
- L-858R(L): Mandatory Sign
- L-858L(L): Runway/Taxiway Location Sign
- L-858B(L): Runway Distance Remaining Sign

L-858Y(L), L-858R(L), and L-858L(L) signs are designed to guide pilots to a particular point on the field, identify location, identify holding positions, identify taxiway and runway intersections, and prohibit aircraft entry into designated areas.

L-858B(L) signs are used at 1,000-foot intervals adjacent to the runway edge in order to provide runway distance remaining information to pilots during takeoff and landing operations.

### 2.2.3 Sign Legends

Type	Purpose	Legend Color	Background Color
L-858Y(L)	Direction, Destination & Boundary	Black	Yellow
L-858R(L)	Mandatory Sign	White with Black Outline	Red
L-858L(L)	Runway/Taxiway Location	Yellow	Black
L-858B(L)	Runway Distance Remaining	White	Black

### 2.2.4 Construction

Corrosion-resistant sign construction requires minimal maintenance.

- Aluminum housing
- Acrylic sign legend panels
- Stainless steel hardware
- Retroreflective sheeting

### 2.2.5 Operating Conditions

Temperature	-40 °F to +131 °F (-40 °C to +55 °C)
Humidity	0 to 100%
Wind	Mode 2 signs withstand 200 mph (322 kph) Mode 3 signs withstand 300 mph (483 kph)

### 2.2.6 Equipment Data

**Table 1: Specifications**

Solar Engine Power Supply (SEPS)	
Installed Weight	132 lb (59.8 kg)
Installed Dimensions	29.9 H x 42.9 W x 17.4 D in (75.9 H x 108.9 W x 44.1 D cm) with wireless antenna at 55° tilt
Temperature	Operating: -22 °F to +122 °F (-30 °C to +50 °C) Storage: -40 °F to +176 °F (-40 °C to +80 °C)



**Table 1: Specifications (Continued)**

Chassis	Weather and corrosion-resistant construction of stainless steel and powder coated aluminum
Mounting	ADB Safegate frangible couplings and floor flange mounts
Wind loading	300 mph min. installed at 55° tilt
Tilt	15°, 35°, 55°
Diagnostics	On-board feedback indicators for PV charging status Low-voltage disconnect Radio status (where optionally equipped)
<b>Shipping</b>	
Shipping Weight	Box 1 (SEPS): 76 lb (34.4 kg) Box 2 (Battery): 68 lb (30.8 kg)
Shipping Dimensions	Box 1 (SEPS): 25.5 H x 46.9 W x 14.0 D in (64.7 H x 119.1 W x 35.56 D cm) Box 2 (Battery): 8.3 H x 13.1 W x 7.4 D in (21 H x 33.2 W x 18.8 D cm)
<b>Battery</b>	
Power	12 VDC 88 Ahr
Disposal	Replaceable and recyclable
Hazmat Control	Absorbent glass mat (AGM) SLA
Lifetime	4,000 cycles to 20% depth of discharge at +68 °F
Charger	Morningstar PWM
<b>LED Driver</b>	
Sign SEPS	Channel A: 18–38 VDC 162 mA Channel B: 18–38 VDC 162 mA
RGL SEPS	Channel A: 18–38 VDC 350 mA Channel B: 18–38 VDC 350 mA
Control Modes	Sign: Dusk-to-dawn RGL: Continuous 24-hour flashing
Load Cabling	22 ft. (6.7 m) cable can exit onto the surface or down into a ground pot
<b>PV Panel</b>	
Power	Minimum 17 VDC, 100 W
Type	High Efficiency Monocrystalline, IEC 61215
Lifetime	10 years at 90% output
<b>Wireless Control</b>	
Frequency	900 MHz (902 - 928 MHz) FHSS 1 W transmission 2.4 GHz DSSS 6.3 mW transmission
Range	900 MHz: Up to 2.5 miles (4 km) 2.4 GHz: Utilizes mesh networking to control all airfield lights
Control, On-Demand Mode	Seamless integration with existing ADB wireless solar products. Up to 8 independent groups. On-demand Temporary Mode Aircraft Radio Control of Aerodrome Lighting (ARCAL)

## 2.2.7 Sign Dimensions and Weights

### Sign Heights - Inches (Centimeters)

Size No.	Type	Sign Face Height	Legend Height	Sign Style No.	Sign Class No.	Overall Mounting Height
1	L-858Y/R/L	18 (45.7)	12 (30.5)	2,3,5	1,2	29.7 (75.5)
2	L-858Y/R/L	24 (61)	15 (38.1)	2,3,5	1,2	35.7 (90.8)
3	L-858Y/R/L	30 (76.2)	18 (45.7)	2,3,5	1,2	41.7 (106)
4	L-858B	48 (122)	40 (101.6)	2,3,5	1,2	58.2 (147.8)
5	L-858B	30 (76.2)	25 (63.5)	2,3,5	1,2	41.7 (106)

### Sign Lengths - Inches (Centimeters)

Size No.	1 Module	2 Module	3 Module	4 Module
1	29.4 (75)	58.6 (149)	87.9 (223)	117.2 (298)
2	35.9 (91)	71.6 (182)	107.4 (273)	143.2 (364)
3	42.4 (108)	84.6 (215)	126.9 (323)	169.2 (430)
4	47.9 (122)	N/A	N/A	N/A
5	42.4 (108)	N/A	N/A	N/A

### Packaging Dimensions (Height x Length x Depth) - Inches (Centimeters)

Size No.	1 Module	2 Module	3 Module	4 Module
1	34 x 34 x 13 (87 x 86.4 x 33)	34 x 63 x 13 (87 x 160 x 33)	34 x 92 x 13 (87 x 234 x 33)	34 x 121 x 13 (87 x 307 x 33)
2	40 x 40 x 13 (102 x 102 x 33)	40 x 72 x 13 (102 x 193 x 33)	40 x 112 x 13 (102 x 285 x 33)	40 x 147 x 13 (102 x 374 x 33)
3	46 x 46 x 13 (117 x 117 x 33)	46 x 89 x 13 (117 x 226 x 33)	46 x 131 x 13 (117 x 333 x 33)	46 x 173 x 13 (117 x 440 x 33)
4	62 x 52 x 13 (158 x 132 x 33)	N/A	N/A	N/A
5	46 x 46 x 13 (117 x 117 x 33)	N/A	N/A	N/A

### Packaging Weight (Estimated) - Pounds (Kilograms)

Size No.	1 Module	2 Module	3 Module	4 Module
1	46 (21)	78 (35)	115 (52)	169 (77)
2	71 (32)	104 (47)	153 (70)	220 (100)
3	81 (37)	131 (60)	199 (90)	252 (114)
4	122 (56)	N/A	N/A	N/A
5	81 (37)	N/A	N/A	N/A



### Note

- Sign depth is 9.4 in (23.9 cm). See [www.adbsafegate.com](http://www.adbsafegate.com) for additional installation information.

## 2.2.8 Solar Panel Orientation

Full solar exposure is critical to the performance of the SSS. Ensure that the SEPS installation location has year-round, unrestricted sun exposure throughout the day. The bottom edge of the solar panels should be installed at a minimum height to clear growing vegetation and snow at the site.



**Note**

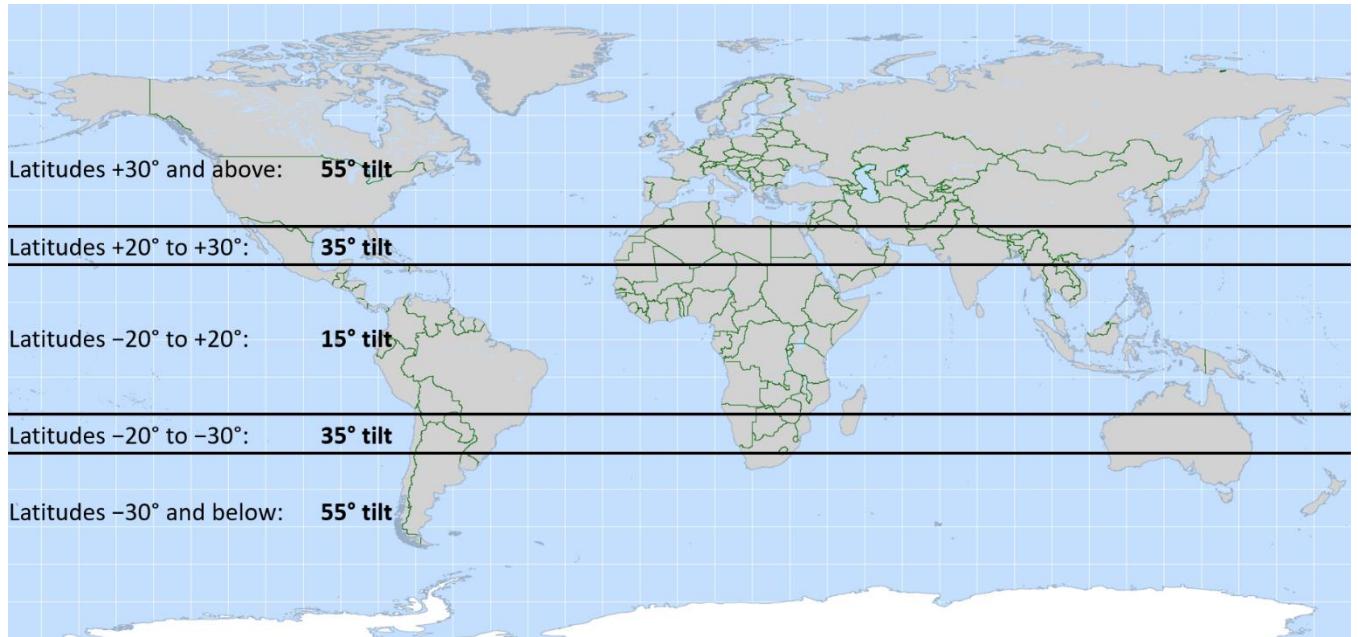
Shading even a small portion of the solar panel will significantly reduce the output of the SSS.

The SEPS system is designed for operation in all global regions. However regions do exist with low sunlight exposure and the SEPS may not be compatible. If you suspect your region may not be compatible with the SEPS system, contact your local representative at ADB Safegate.

**2.2.9 Solar Panel Tilt Angles**

The tilt angle is dependent on your location, see map below.

**Figure 1: Solar Panel Tilt Angle Map**



**2.2.10 Equipment Storage**

If equipment is to be stored prior to installation, it must be protected from the weather and kept free of condensation, dust, and extreme temperatures.



**CAUTION**

To avoid damage the the LED Sign and SEPS, store at -40 °F to +176 °F (-40 °C to +80 °C).



**CAUTION**

To avoid damage to the lead acid battery while storing the SEPS, ensure the battery remains in a charged state. By fully discharging your lead acid battery, or even discharging it below 80% of its rated capacity, the battery could be permanently damaged resulting in reduced performance and premature failure.

**2.3 Wireless Hand-Held Controller**

The Hand-Held Controller contains a radio that transmits commands to a receiving radio inside a controlled product. The controlled light or sign operates in one of three modes. The most commonly used modes are Autonomous and Temporary mode. A Continuous mode is available, however special caution should be taken due to the risk of depleting the battery.

In Autonomous Mode, the change from day-to-night or night-to-day is known as a transition. For solar signs and solar elevated runway guard lights, the solar panel detects day/night and transitions accordingly. Solar Signs turn on during the night and off during the day. Solar Runway Guard Lights remain on during day and night operation.

In Temporary Mode, activation interrupts other modes and ignores transitions. This activation lasts for a preset time. This preset time is specific to each light and is not stored in the hand-held controller.

Refer to the product manual for more details of the wireless hand-held controller.

---



### **WARNING**

Continuous selection of the temporary mode may exceed the maximum allocated time period of operation and may cause the battery to discharge below critical levels.

---

#### **2.3.1 Features**

- Water-resistant LED keypad and indicators
- Sealed, rugged aluminum body with MIL-spec connectors
- Meets MIL-SPEC-810E environmental requirements
- 900 MHz and 2.4 GHz frequency available
- 900 MHz control range of up to 2.5 miles (4 km)
- 2.4 GHz control utilizes mesh networking to control all airfield lights
- Uses an encrypted secure wireless RF signal
- Compatible with stand-alone aviation band VHF receiver
- 24-hour operation on a single fully charged battery
- Controls up to eight independent groups of lights
- Rechargeable lithium-ion battery (included)
- Aircraft Radio Control of Aerodrome Lighting (ARCAL)
- Advanced configuration and diagnosis commands
- Compatible with stand-alone aviation band VHF receiver
- Administrator and user password controls
- Made by Flash Technology for ADB Safegate solar lighting systems

## 3.0 Installation



### WARNING

Read installation instructions in their entirety before starting installation.

- Refer to the FAA Advisory Circular AC 150/5340-26 (current edition), Maintenance of Airport Visual Aids Facilities, for instructions on safety precautions.
- Observe all safety regulations. To avoid injuries, always disconnect power before making any wiring connections or touching any parts. Refer to FAA Advisory Circular AC 150/5340-26 (current edition).
- Sign installation requires a flat mounting surface and the sign to be level to prevent legend panels from becoming distorted.
- Failure to install and level sign per the instruction manual will void the warranty

Each sign is furnished complete with mounting flanges for installation on a concrete pad, which is the recommended method of installation. Refer to ADB Safegate solar sign manual for typical sign installations. Contact ADB Safegate Sales Department for more information on sign installation hardware.

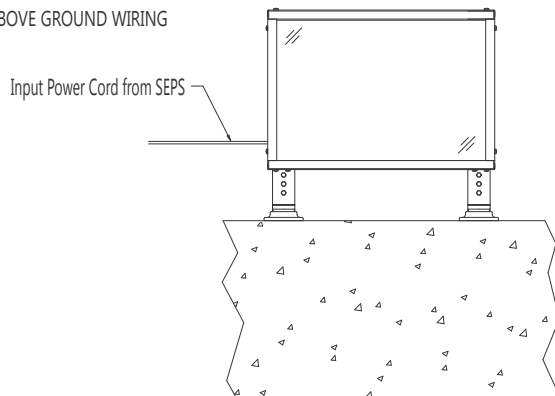
1. Mounting flanges and frangible couplings (included with sign)
2. Concrete anchor bolts (contractor supplied)
3. Side entry cable gland (included with sign)
4. Power cable (included with SEPS)

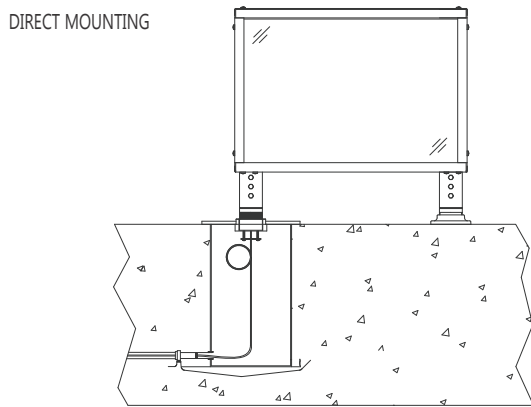
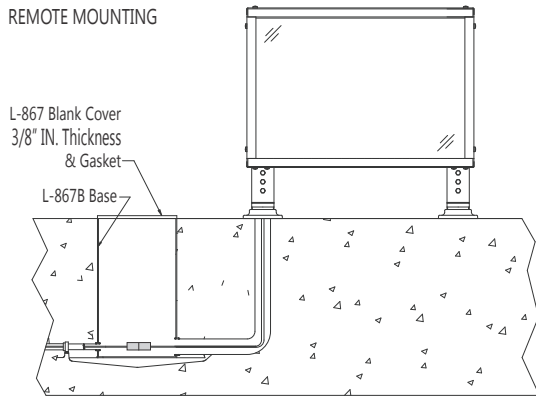
The Solar Engine Power Supply (SEPS) has to be installed on a level concrete pad within 20 feet of the solar sign. Concrete pad installation requires two frangible couplings and two floor flanges, which are ordered separately from the SEPS unit (Part No. 94A0581).

For below ground wiring, L-867B base cans need to be installed under each sign and SEPS and cabling can be routed through the legs.

For a temporary application, the wiring between the SEPS and the Sign can be above ground. Both the Sign and SEPS contain compression fittings for power cable access.

ABOVE GROUND WIRING





### 3.1 Unpacking

The equipment is shipped ready for installation. Handle equipment very carefully to prevent component damage. Unpack the carton upon receipt and check the contents and their condition. Note any exterior damage to the carton that might lead to detection of equipment damage.

If you note any damage to any equipment, file a claim with the carrier immediately. The carrier may need to inspect the equipment.

## 3.2 General Guidelines



### WARNING

- Signs must be grounded to a true earth ground. Failure to observe this warning may result in personal injury, death, or equipment damage.
- When installing signs, follow the guidelines covered in FAA AC 150/5340-30 (current edition), Fig 126 for mounting pad design. Also see the following subsections for detailed information on sign pad and leveling of the sign.
- FAILURE TO INSTALL AND LEVEL THE SIGN AS DESCRIBED IN THE VARIOUS SUBSECTIONS BELOW WILL VOID THE WARRANTY

- Mount the signs on a concrete slab or concrete pedestals
- Do not allow concrete edges to protrude above grade.
- For below ground installations, provide power to the signs through breakaway cable connectors installed within the frangible coupling portion of the sign's mounting legs.

### 3.2.1 Overall Mounting Height

Install signs so that the overall height above the surrounding ground of the sign assembly, including mounting supports, does not exceed heights given in [Sign Dimensions and Weights](#) and the clearances of aircraft wings as specified in AC 150/5340-18 (current edition). The sign must provide 12 inches (304.8 mm) of clearance between the top of the sign and any part of the most critical aircraft using, or expected to use, the airport when the aircraft's wheels are at the pavement edge. For overall mounting height, refer to AC 150/5345-44 (current edition).

### 3.2.2 Sign Orientation

When orienting signs follow the guidelines below

- Orient the sign so that the face is perpendicular to the centerline of the taxiway or runway.
- For special situations refer to FAA AC 150/5340-18 (current edition) for the correct orientation.

### 3.2.3 Sign Distance from Pavement Edge

Refer to [Table 2](#) for the distance of signs from the pavement edge. Refer to AC 150/5340-18 (current edition) for more information on the location of different types of taxiway signs.

**Table 2: Recommended Sign Distance from Pavement Edge**

Sign Size	Distance from Pavement (ft)	Distance from Pavement (m)
1	10-20	3.1-6.1
2	25-35	7.6-10.7
3	35-60	10.7-18.2
4	50-75	15.2-22.9
5	20-35	6.1-10.7

### 3.2.4 Sign Installation on a Concrete Pad



#### Note

Follow site plans and specifications for concrete dimensions.

#### 3.2.4.1 Concrete Pouring

See FAA AC 150/5340-30 (current edition), for concrete base design.

**i Note**

A customer-supplied template is recommended to hold the bolts in position while the concrete sets. Anchor bolts (customer-supplied) must be a minimum of 1.25 inches (31.75 mm) above the top surface of the concrete pad to attach the mounting bases. Hilti Quick Bolts (wedge-bolt) or Red Head Trubolt Wedge Anchors are recommended for installing the flanges after the concrete sets (customer-supplied). Check with the manufacturer for their recommendations as applied to your airport site.

---

**Figure 2: Example of Hilti Kwik Bolt 3 Standard Thread 304 Stainless Steel**



**i Note**

With either anchoring system, the allowable load for any specific bolt is dependent upon several factors; type of concrete, depth of embedment, edge distance, anchor spacing, etc. ADB Safegate can advise the customer of various manufacturers of anchor bolts, but ADB Safegate cannot approve their specific installation.

---

**Figure 3: 2-Bolt Mounting Flange for Mode 2 and Mode 3 Size 1 Signs, for Mode 2 Size 2, 3, 4 and 5 Signs. Part Number 62A2142**

6" Diameter Bolt Circle  
2.5"-8 NPT (Tapered)  
Flange Thickness: 7/16"  
Dimensions: 7 1/2" x 5 1/16"



**Figure 4: 4-Bolt Mounting Flange for Mode 3 Size 2, 3, 4, 5 Signs. Part Number 62A2146**

5 5/8" Diameter Bolt Circle  
2 1/2"-8 NPT (Tapered)  
Flange Thickness: 3/8"  
Dimensions: 7 3/4" x 7 3/4"



### 3.2.5 Sign Mounting

---

**i Note**

Signs are totally assembled at the factory and are ready for direct installation. Mounting flanges may be removed to lubricate the threads of the frangible coupling with anti-seize compound before installing sign.

---

To mount the sign onto the concrete pad to insure the assembly is flat, perform the following procedure:

1. When the sign is ready to be bolted to the concrete pad set the sign assembly on the concrete pad and position the sign over the anchor bolts. Hand-tighten the bolts or nuts to fasten the mounting flanges to the concrete pad.
2. To ensure that the sign assembly is mounted flat on the concrete pad, first loosen all three hex set screws found on each frangible coupling that are installed on the sign.

See [Figure 5](#). Once all the hex screws are loosened each of the sign legs will float free inside the frangible coupling that is screwed into the mounting flange. Second, use a bubble, digital, or laser level to verify that the assembly is flat and level. Adjustments to make the assembly flat and level can be made by raising or lowering one end of the sign assembly to make the assembly flat and level.

---



**i Note**

Once the assembly is flat it may be necessary to block-up or hold the assembly in the flat position until all of the hex set screws can be re-tightened on each of the frangible couplings to secure the sign leg to the coupling. Once the sign is flat and level finish tightening the mounting bolts to their correct torque value.

If the sign pad is tapered in the area when the mounting flanges are located shims may need to be placed under the mounting flanges to ensure that the coupling frangibility characteristics are the same for each coupling. If in doubt, contact ADB Safegate, Americas Engineering.

**Figure 5: Sign Frangible Coupling and Mounting Flange Assembly**



Leg Set  
Screws



**CAUTION**

- Sign frangible couplings are uniquely designed for use on the sign size stamped on the coupling and can only be used for that particular size sign. If couplings must be replaced, make sure the sign size on the couplings matches the size sign on which they are to be installed.

**3.2.6 Earth Ground Lug**



**WARNING**

- Signs must be properly grounded to true earth ground. Failure to observe this warning may result in personal injury, death, or equipment damage.

Attach the earth ground lug. The earth ground lug is located on the outside frame of the sign to permit easy connection of an AWG 12 (minimum) earth ground wire to the sign. If necessary, you may remove the ground lug from the outside and place it on the inside.



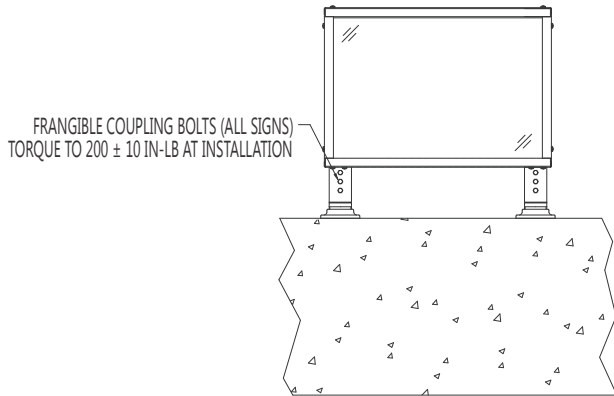
**3.2.7 Sign Frangible Coupling Installation**

Ensure sign is level before torquing frangible coupling bolts.



## CAUTION

- Sign frangible couplings are uniquely designed for use on the sign size stamped on the coupling and can only be used for that particular size sign. If couplings must be replaced, make sure the sign size on the couplings matches the size sign on which they are to be installed.



### 3.2.8 Sign Tethers

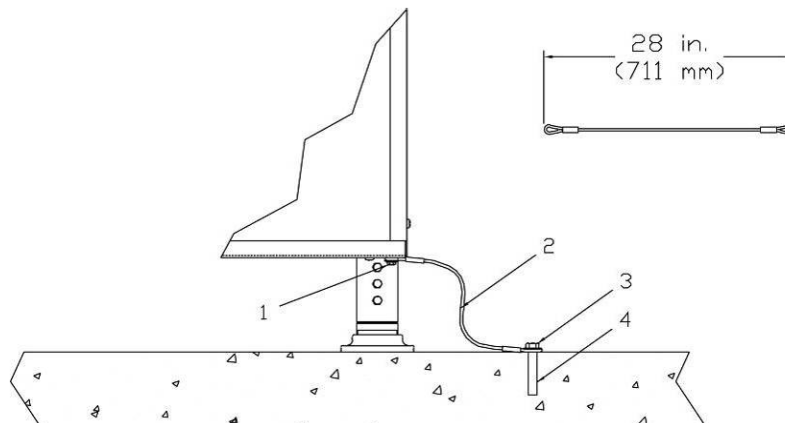
See Figure 6. Tethers are shipped installed on the sign. Location and quantity of the tether(s) are determined when the sales order is placed. Additional tethers are available upon request.



## Note

In the tether installation procedure below, the customer supplies the mounting hardware to attach one end of the tether to the concrete pad. The customer also supplies the expansion anchor for the bolt.

**Figure 6: Installing the Sign Tether**



1. Existing 5/16-18 x 3/4 in. Bolt
2. Tether
3. Mounting Hardware Attached to Expansion Anchor
4. Expansion Anchor for Bolt
5. To attach a tether, install the customer-supplied mounting hardware (3) to attach the tether to the expansion anchor (4) on the concrete pad

### 3.3 SEPS Installation

#### 3.3.1 Site Preparation

Follow these steps to prepare the installation site:

1. Ensure that the site has year-round, unrestricted sun exposure throughout the day.



#### Note

Shading even a small portion of the solar panel will significantly reduce its ability to collect solar power.

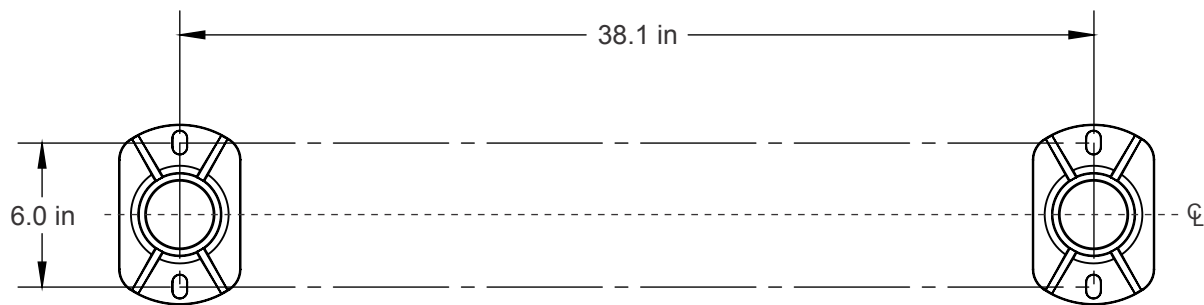
2. Any pad design should meet FAA AC 150/5340-30 (current edition):

- a) Above ground wiring: install a level concrete pad within 20 ft. of the load that SEPS will be powering. Mounting to wood, soil, or asphalt may work but is not recommended since they will not have the strength required for high wind loads.
- b) Below ground wiring: install a level concrete pad with L-867B base can and base plate or conduit within 20 ft. of the load that SEPS will be powering.

3. Use the below template (in inches) to mark 4 mounting points for the 2 floor flanges.

Note that the centerline of SEPS should be parallel to the equator, so that the installed solar panel will face south in northern latitudes and north in southern latitudes.

**Figure 7: Mounting Template for SEPS Installation**



4. At each of the 4 mounting points, install a ½-13 UNC anchor bolt or stud.

#### 3.3.2 Assembly

Follow these steps to assembly the SEPS:

1. Open SEPS's solar panel lid by loosening the 2 black, captive thumb screws under the bottom lip.



#### Note

Slowly hold and open the lid since it has a gas shock that will push the lid open.

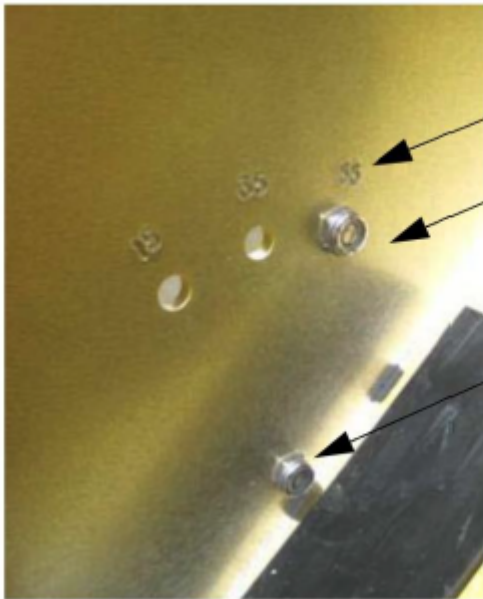
Lid is designed to best open and close once SEPS is fully installed and the lid can open quickly when SEPS is lying flat on the ground during preparation.

2. Unpack two mounting posts and their fasteners from within SEPS.



Mounting Post inside  
SEPS

3. Slide the mounting post down its oblong hole. Align mounting post's bottom bolt hole with the bottom bolt hole in the chassis. Loosely install the 5/16-18 UNC bolt from the outside and the nut on the inside. Note that this bolt does not have extra length and when tightened will pull the chassis frame members together.
4. Tilt the mounting post to its desired tilt angle and install top bolt and nut. Tighten both top and bottom fasteners. Tilt angle is dependent on your location. See [Figure 1](#).



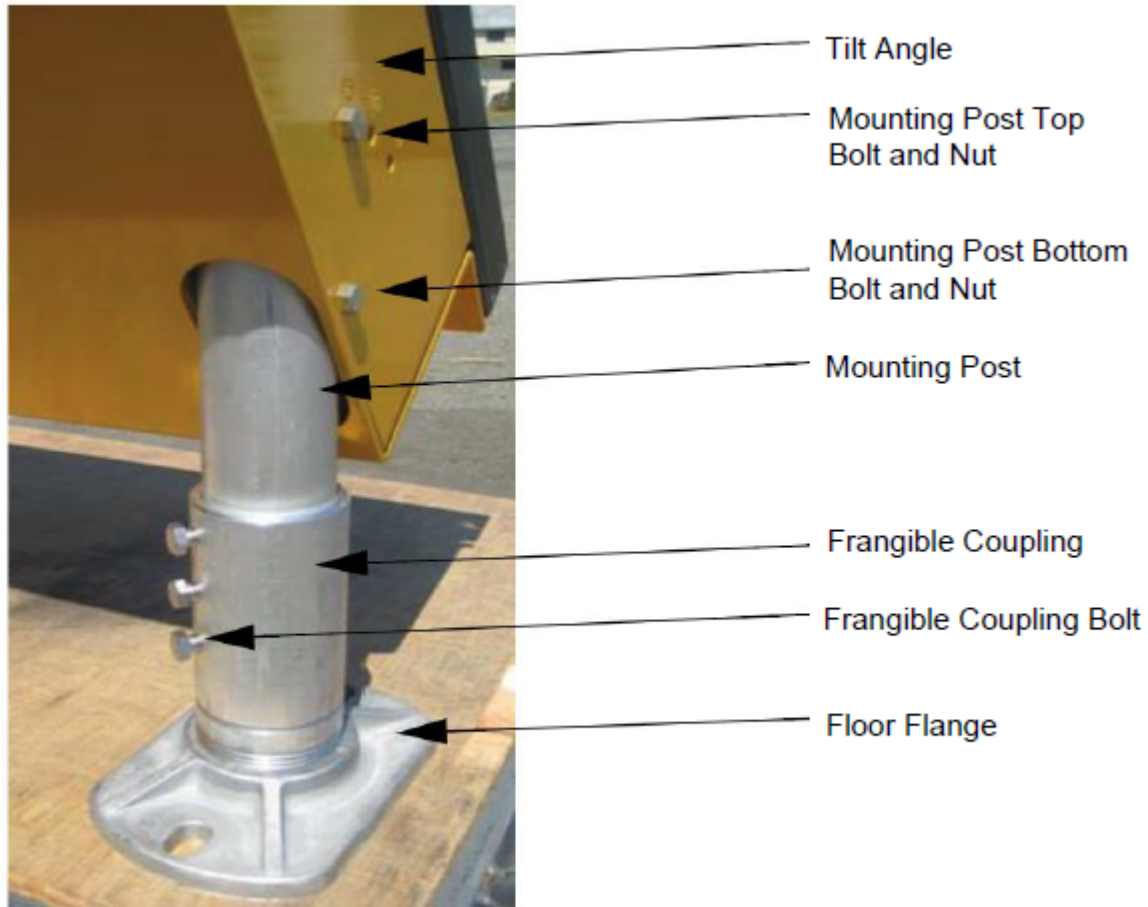
Tilt Angle

Mounting Post  
Top Bolt and Nut

Mounting Post  
Bottom Bolt and Nut

5. Repeat above steps for second mounting post.
6. Close the lid and finger tighten the thumb screws to better balance the unit.
7. Thread the frangible coupling into the floor flange until tight. Install the frangible coupling's 3 bolts. Repeat for second subassembly.

8. Slide the frangible coupling subassembly onto the mounting post. Finger tighten 1 of the frangible coupling's screws to hold the subassembly onto the mounting post. Repeat for second subassembly.

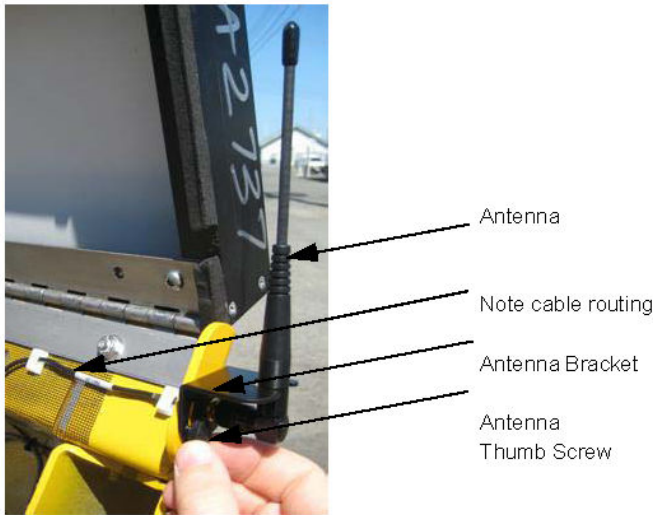


9. Pick up the SEPS and set down over the 4 anchor bolts installed above. If required, loosen frangible coupling bolts to adjust the rotation of frangible coupling. Do not loosen the floor flange and frangible coupling thread.
10. Tighten all frangible coupling bolts. Tighten all anchor bolts.

### 3.3.3 Antenna Assembly

If your SEPS has wireless control capability, it will have a wireless antenna subassembly that needs to be installed. During manufacturing, the antenna is uninstalled and placed inside SEPS to protect it from shipping damage. To install:

1. Open lid slowly and carefully unpack antenna subassembly.
2. Remove 8-32 UNC thumb screw and its toothed washer.
3. Slide antenna cable back through hole to remove slack.
4. Ensure antenna and bracket are vertical and re-install thumb screw and toothed washer.
5. Route cable as shown below.



### 3.3.4 Grounding

---

**i Note** Failure to install an appropriate grounding system may cause a safety risk in the event of lightning strike, electrostatic discharge (ESD), or damaged cabling.  
Failure to install an appropriate grounding system will increase the risk of system damage in the event of lightning strike or ESD.

---

Surges resulting from lightning strikes in the proximity of the installation are one of the most common causes of solar system failure. Installation of an appropriate grounding system allows the static electricity that accumulates in the solar panel and mounting structure to discharge. In addition to preventing the attraction of lightning, a properly grounded installation may divert the surge associated with lightning from electrical circuitry, limiting the potential for damage.

SEPS is negatively grounded. The solar panel frame, solar panel negative terminal, battery negative terminal, chassis, and grounding lug are all electrically connected together.

SEPS should be grounded as follows:

1. Install a 14-2 AWG stranded grounding wire (not included) into the grounding lug under the bottom lip of the chassis.
2. Connect the grounding wire to an appropriate grounding stake and install the stake in the ground.
3. Note that the load cable does not provide any grounding for the load.

The load should also be properly grounded to prevent damage to it and SEPS.

Grounding techniques vary depending on site specifics and local electrical authorities. Consultation with a local grounding expert is recommended.

### 3.3.5 Wiring

---

Follow the guidelines below for wiring the SEPS to the LED sign.

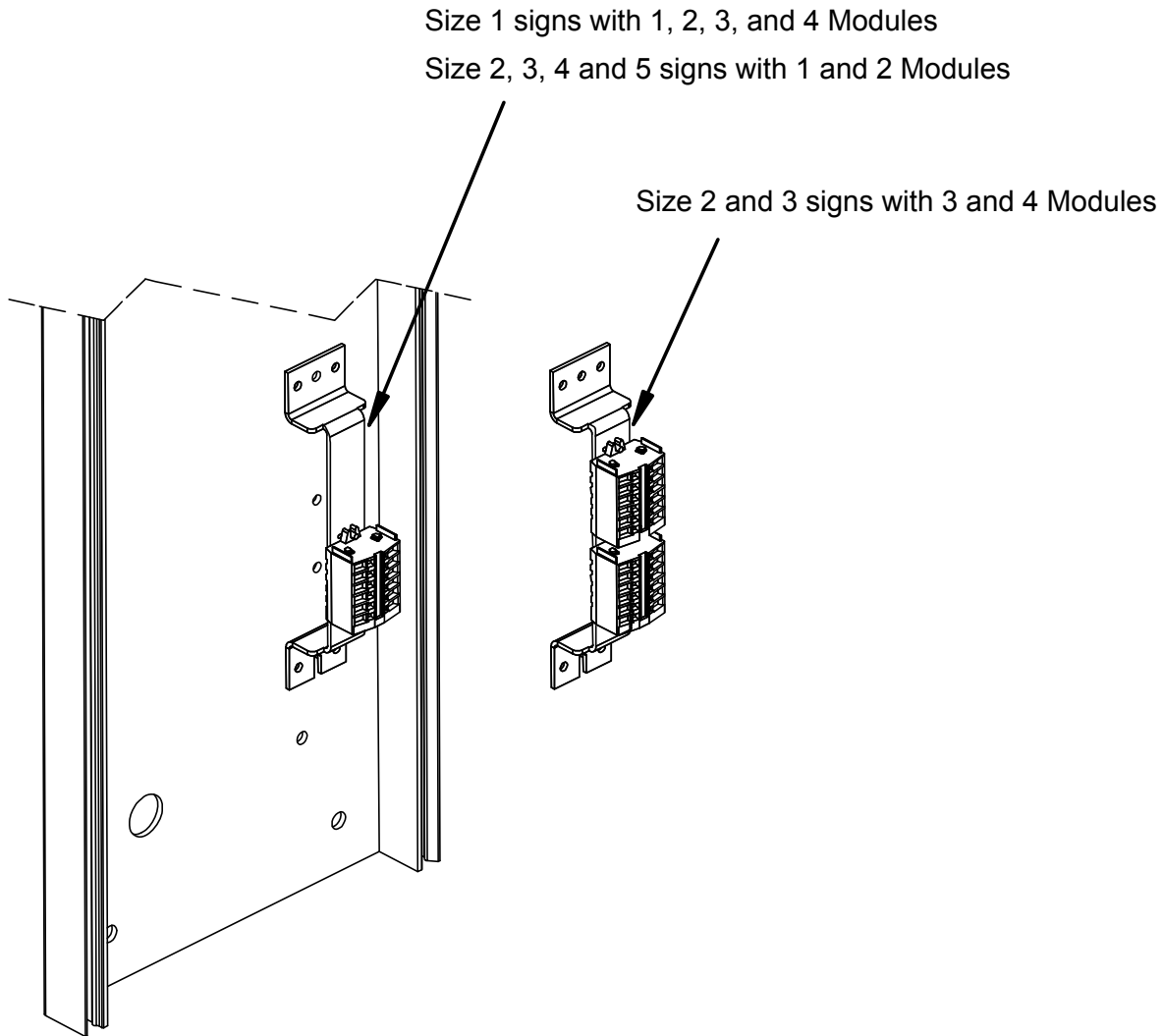
---

**i Note** After wiring the SEPS to the LED sign, it is always recommended to test the sign operation before installing the legend panels and closing the enclosure.

---

The load cable from the SEPS enters the sign through a cable gland (also called a cord grip) and is to be terminated at the terminal block shown in [Figure 8](#). The terminal block is located inside of the sign mounted onto the side panel.

**Figure 8: Solar Sign Terminal Block**

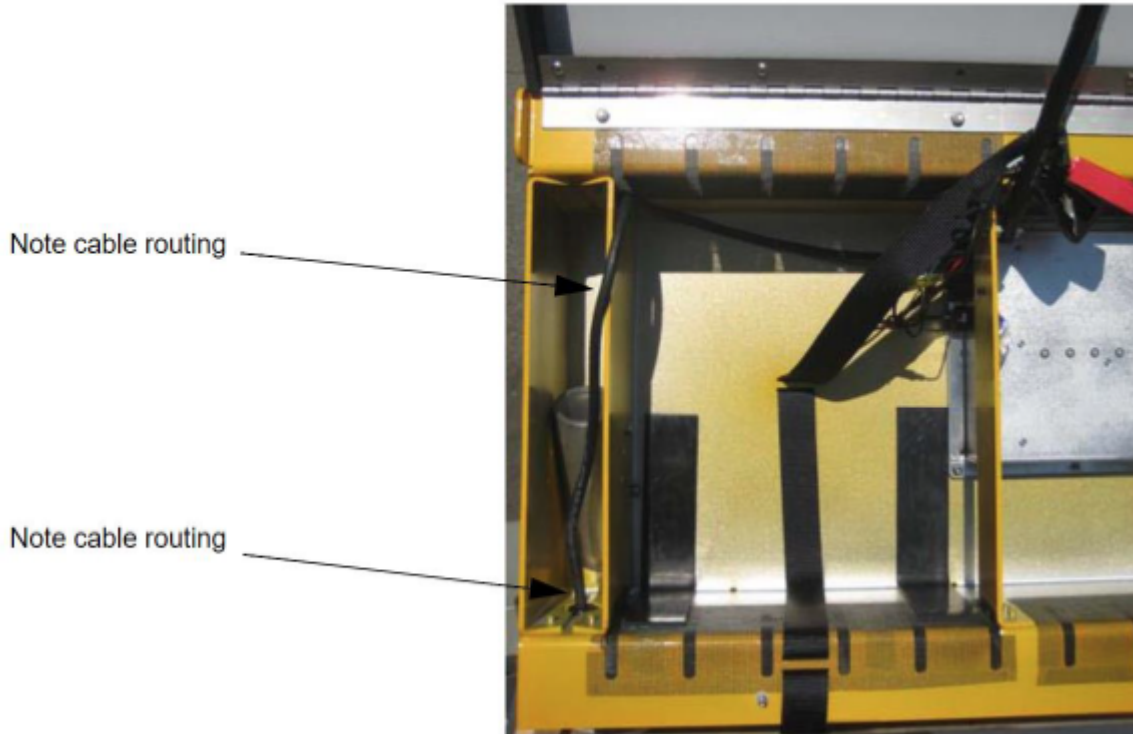


### 3.3.6 Connect Load

Connect the SEPS to the sign load as follows:

1. Uncoil the load cable. The cable is stiff and should be routed above where the battery will be installed.
2. For installations with cabling going into conduit below ground, feed the load cable down through the SEPS mounting post. For a more finished look, the black, liquid tight cable fitting exiting the SEPS unit may be replaced with the included 7/8 in. hole plug.

3. For installations with cabling lying on the surface of the ground, feed the load cable out of the SEPS through the liquid tight cable fitting. Tighten fitting.



4. Pull the loose end of the load cable into the sign to connect to the sign terminal block(s).
5. Connect 2 or 4 conductors of the load cable to the terminal block(s) as per the electrical load connection diagrams.

**Figure 9: SEPS Load Cable**



**Note**

The SEPS outputs are constant-current and designed to drive LEDs only. They do not provide DC voltage.

---



Figure 10: Wiring a 1 Module Sign (Size 1, 2, 3, or 5)

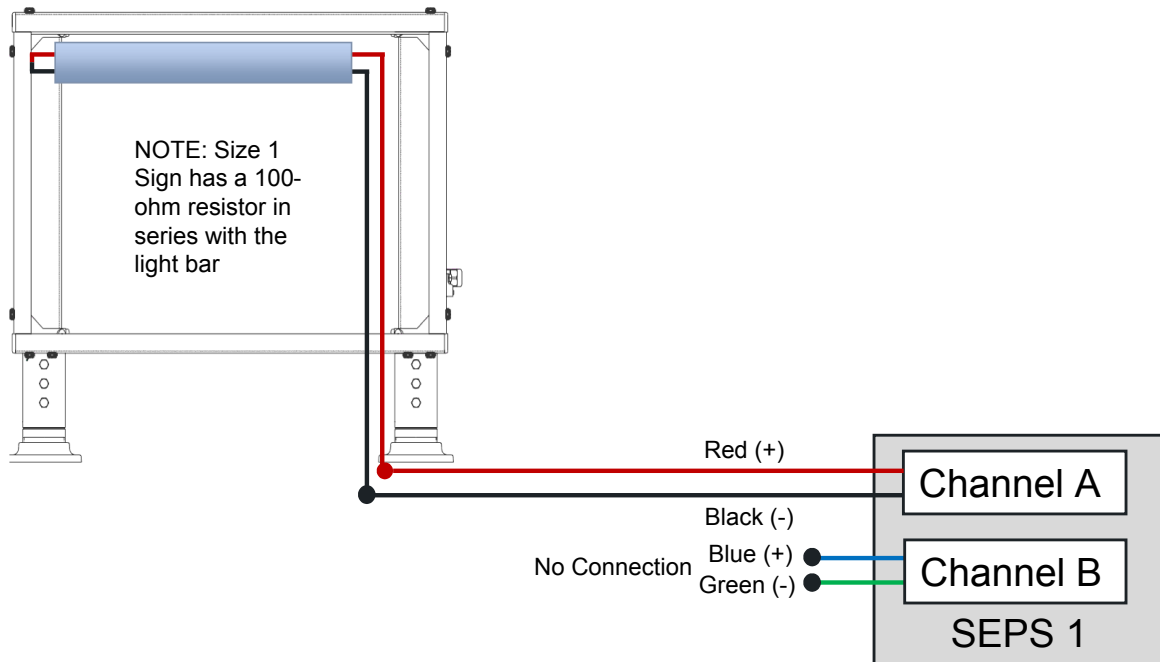
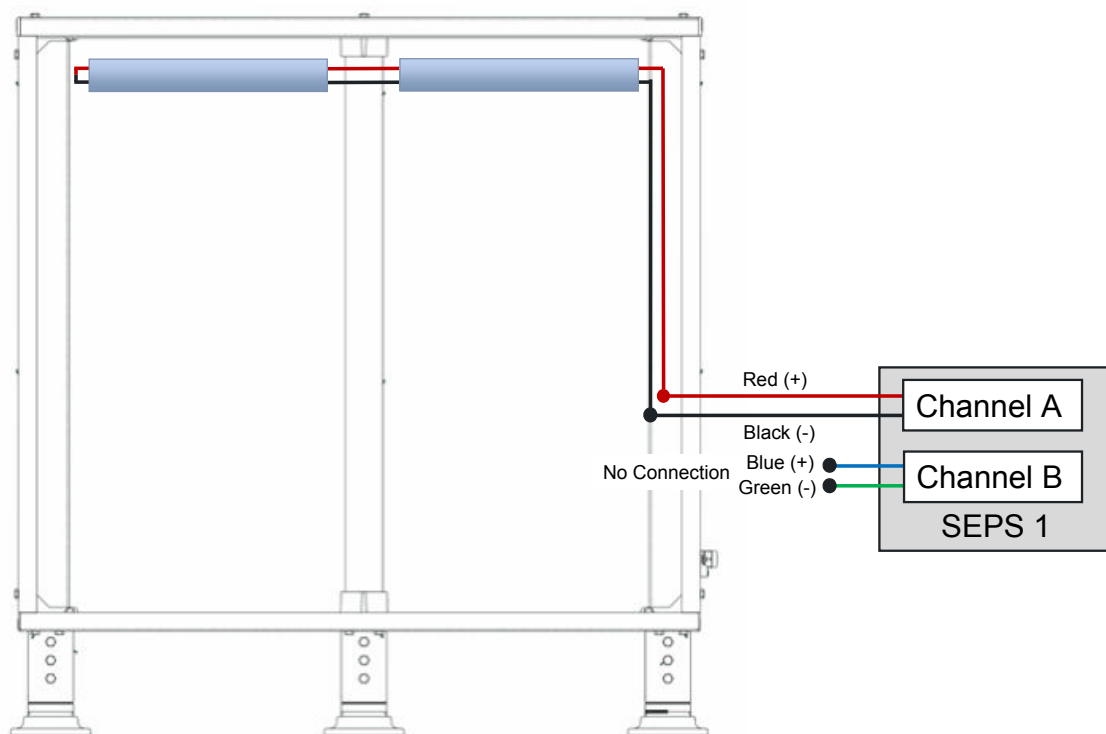
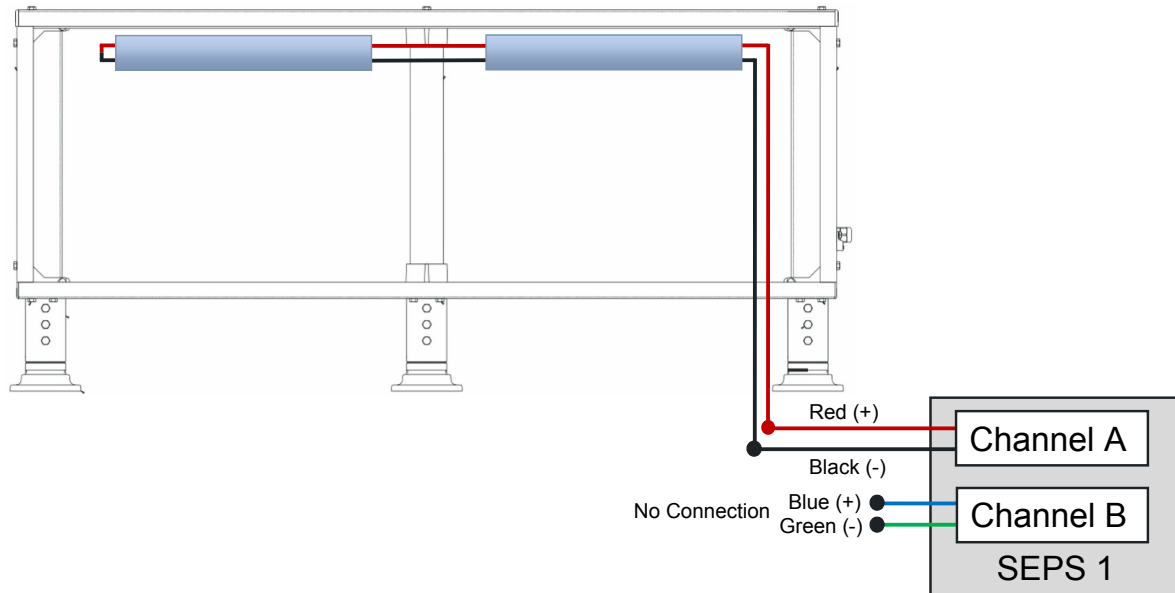


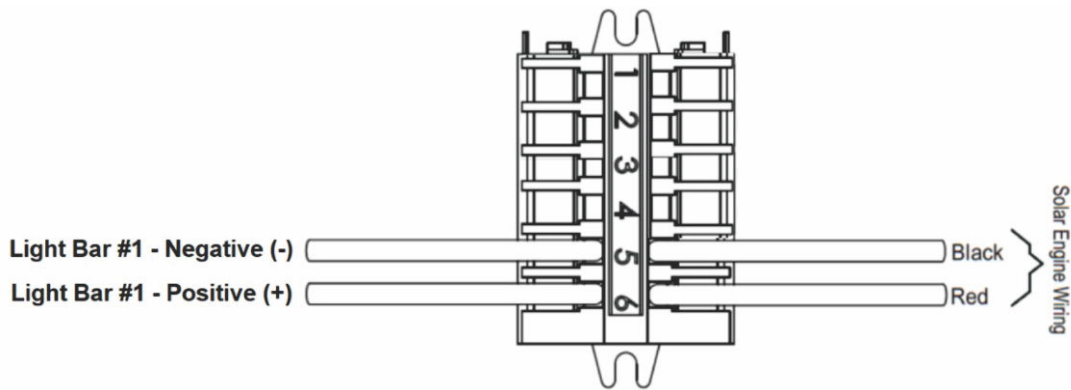
Figure 11: Wiring a 1 Module Sign (Size 4)



**Figure 12: Wiring a 2 Module Sign (Size 1)**



**Figure 13: Wiring Terminal Block Channel A Only**



**Note**

Size 1, 2 module signs will have 2 Light Bars wired in series connected to the terminal block and wired to SEPS channel A in the same manner as Size 4, 1 module signs are wired to SEPS channel A.

Figure 14: Wiring a 2 Module Sign (Size 2 or 3)

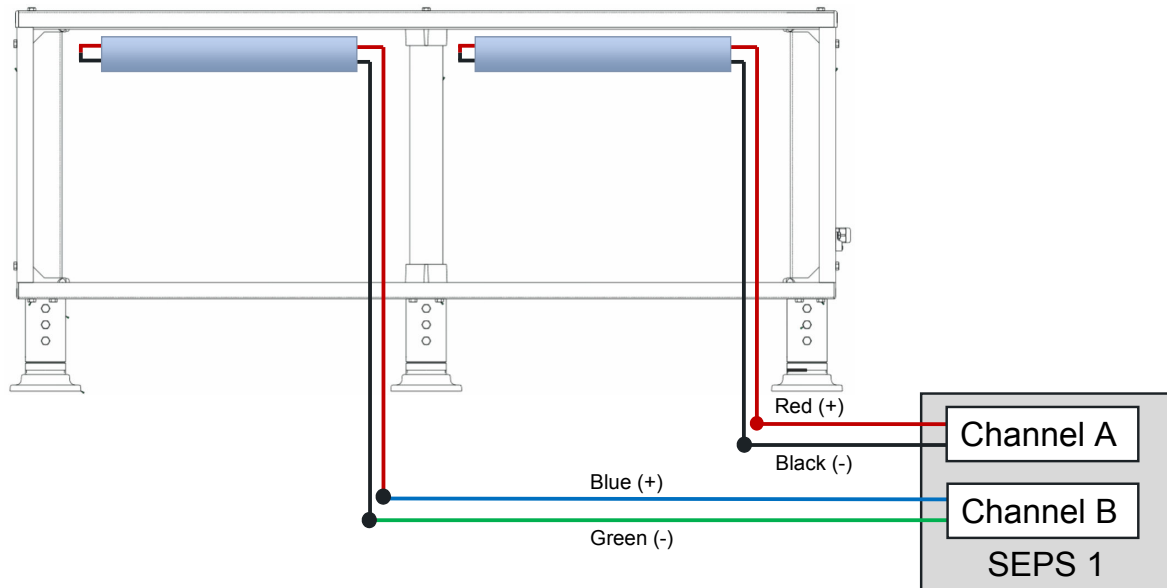
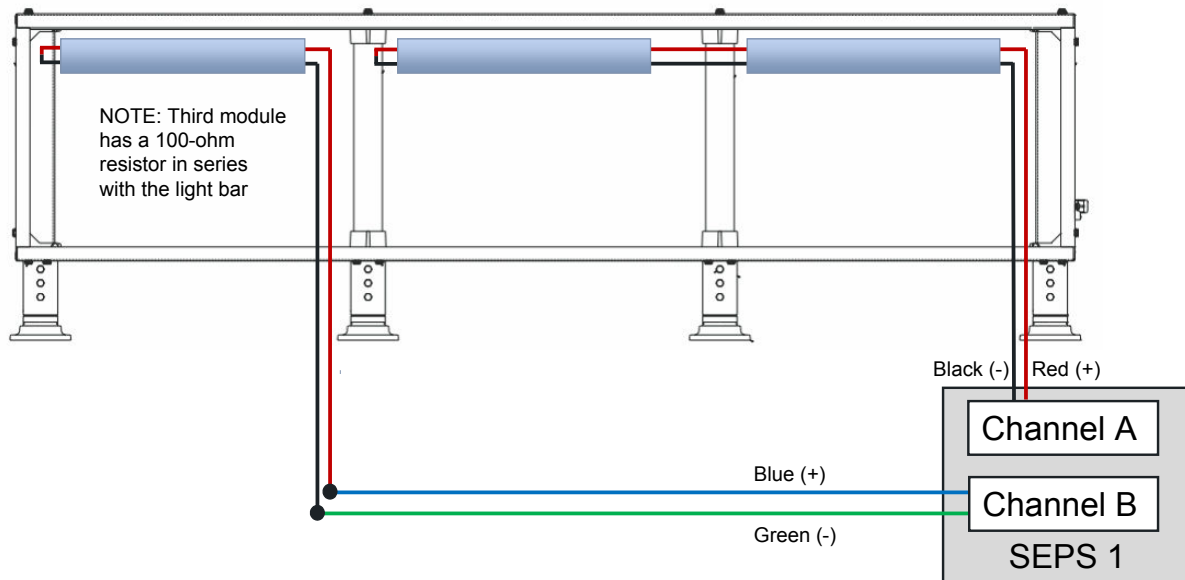
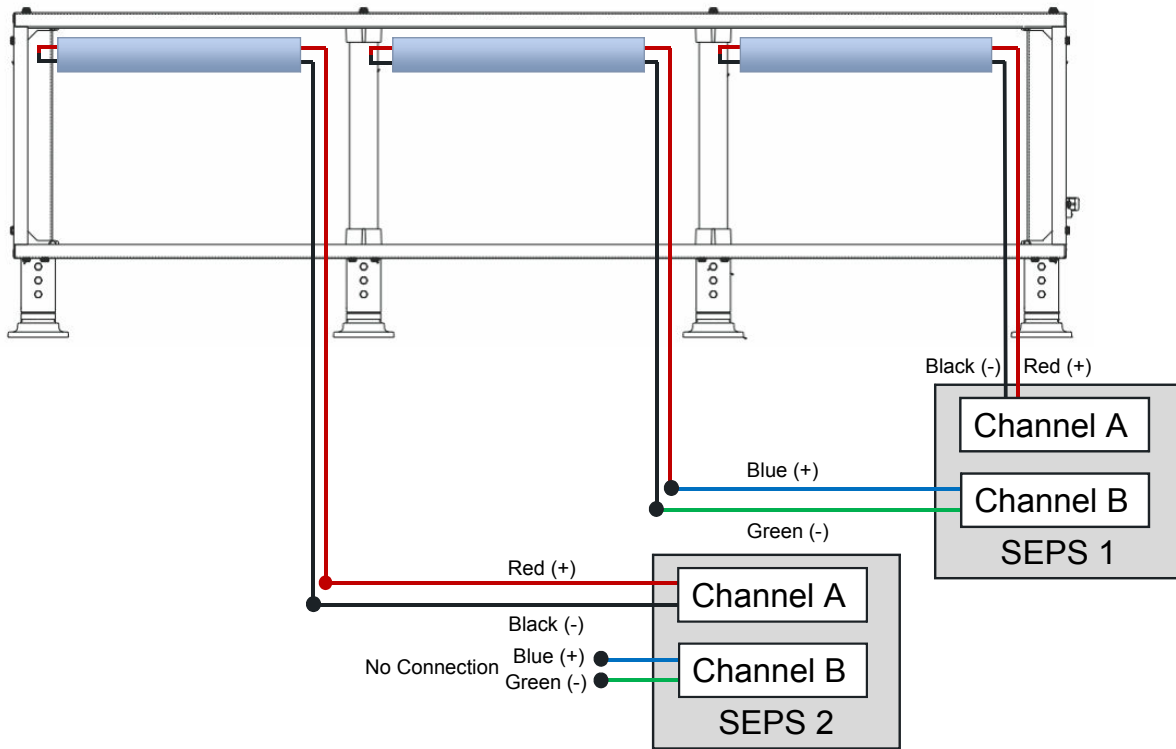


Figure 15: Wiring a 3 Module Sign (Size 1)



**Figure 16: Wiring a 3 Module Sign (Size 2 or 3)**



**Figure 17: Wiring a 4 Module Sign (Size 1)**

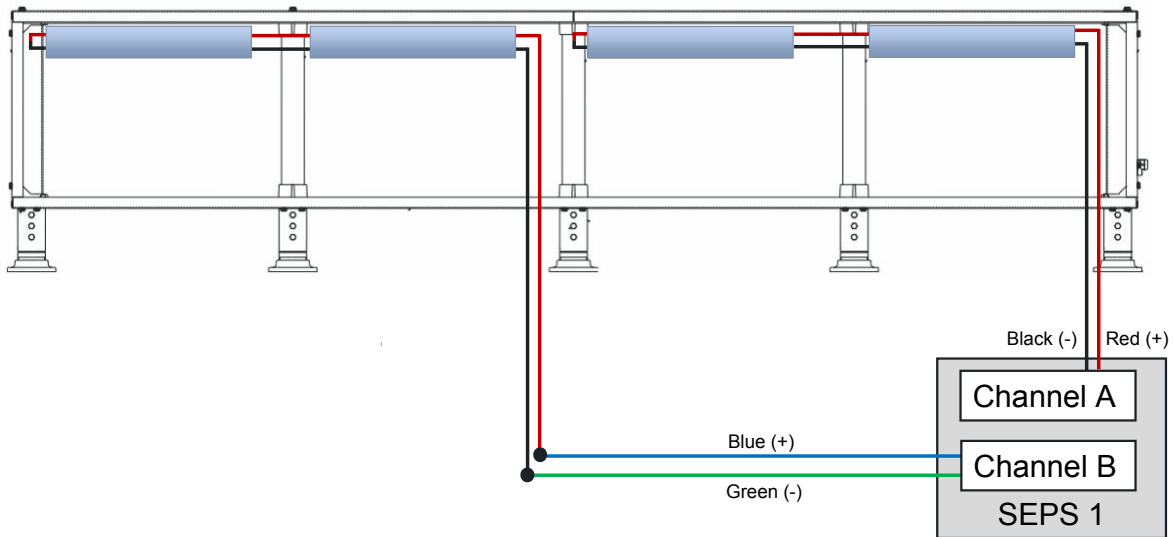
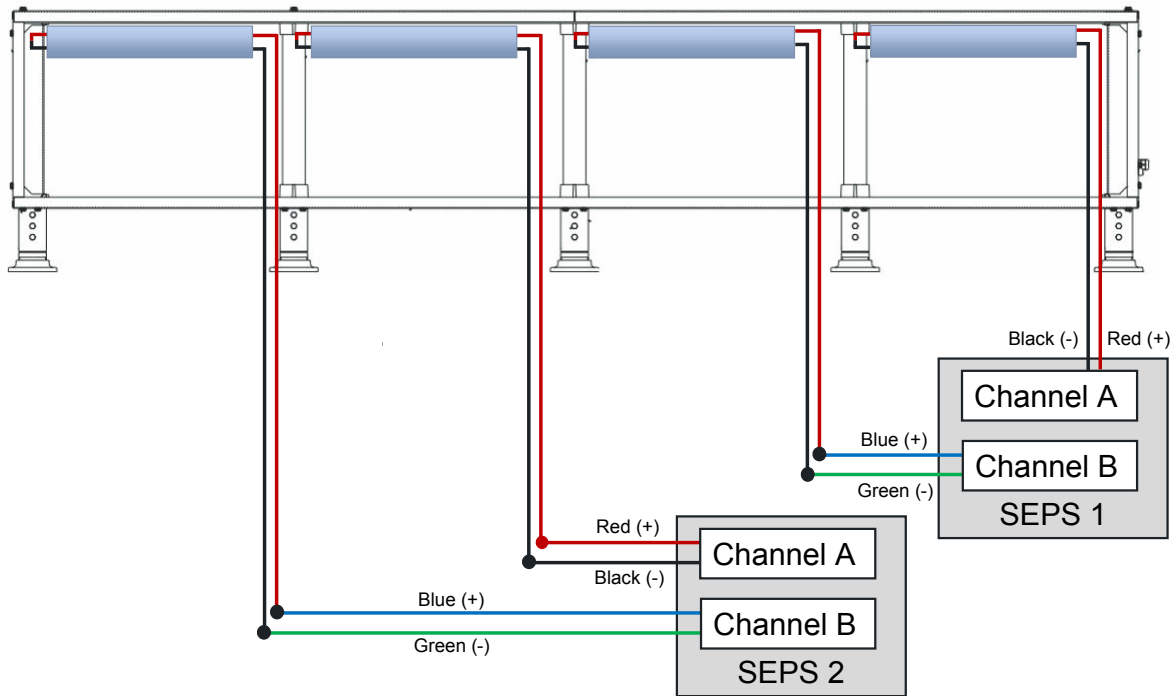


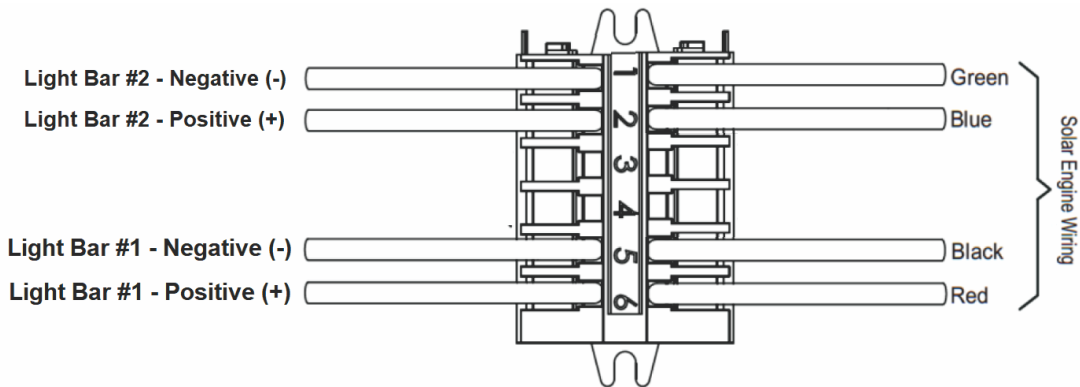
Figure 18: Wiring a 4 Module Sign (Size 2 or 3)



**Note**

Check the terminal connector in the sign to ensure that each light bar is wired separately and not connected in parallel. Earlier versions of SEPS uses parallel light bar connections, while the current SEPS P1 version does not.

Figure 19: Wiring Terminal Block Channel A and B



**Note**

Size 1, 3 module signs will have 2 light bars wired in series connected to the terminal block and wired to SEPS channel A and 1 light bar connected to the terminal block wired to channel B.  
 Size 1, 4 module signs will have 2 sets of 2 light bars each wired in series and connected to the terminal block wired to SEPS channel A and channel B.



### Note

Size 2 and 3, 3 module signs are equipped with 2 terminal blocks with 1 terminal block wired to SEPS channel A and channel B and 1 terminal block wired to channel A.  
Size 2 and 3, 4 module signs are equipped with 2 terminal blocks each wired to SEPS channel A and channel B.

---

## 3.3.7 Install Battery

---



### DANGER

ELECTRICAL SHOCK HAZARD.  
DO NOT LET THE BATTERY TERMINALS COME INTO CONTACT WITH ANY EXPOSED METAL.

---



### WARNING

Batteries are shipped fully charged. Use extreme caution when handling the batteries as they can generate hazardous short-circuit currents.

- Remove all jewelry (bracelets, metal-strap watches, rings) before attempting to handle or remove the battery.
  - Be careful not to short battery terminals with tools.
- 



### WARNING

Batteries are heavy. Ensure that you use proper lifting techniques when moving the battery.

---



### Note

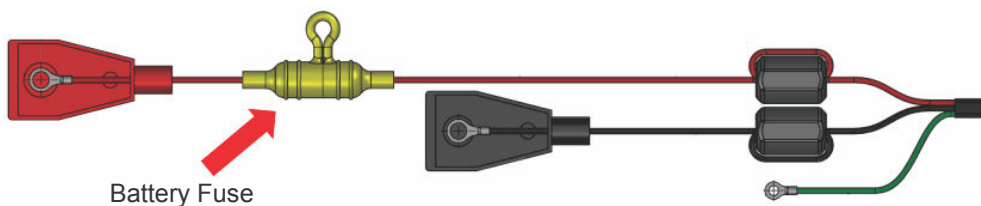
Do not discard batteries in the garbage – please recycle!  
These batteries are rechargeable lead-acid batteries. Consult your local municipal by-laws for information on recycling.

---

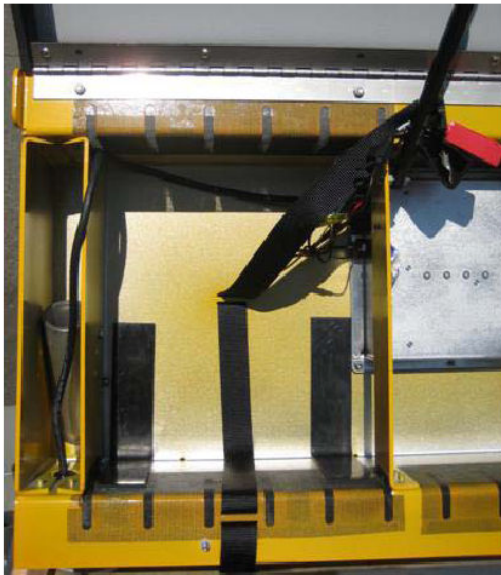
The battery must always be installed last, after site preparation, assembly, wireless assembly, grounding, and load connection. There is no switch to power up the system. Once the battery and its fuse are installed, SEPS's EMS turns on. The EMS will immediately attempt to charge the battery from the solar panel.

The battery sits in the left hand cavity inside SEPS. To install the battery:

1. Remove the battery fuse from the battery harness.



2. Release the battery strap buckle and loosen the buckle to the end of the strap.
  3. Loop the strap buckle and battery harness leads out of the way.
-



4. Balance the battery on the bottom lip of the SEPS chassis and then slowly let it drop back into its cavity. Do not let the battery fall backwards or crush any electrical connections.



5. Battery terminals should be closest to you, with the positive (+) on the left and negative (-) on the right.
6. Loop the battery strap under the battery handle. Connect the battery strap buckle. Tighten the battery strap and fold loose end underneath itself.
7. Loop the positive (+) harness lead under the battery handle. Apply anti-corrosion compound (not included) to the terminal. Connect the harness lead to the terminal and slide on the red, positive, battery terminal boot. Use supplied 5/16-18 UNC nut and lock washer.
8. Loop the negative (-) harness lead under the battery handle. Apply anti-corrosion compound (not included) to the terminal. Connect the harness lead to the terminal and slide on the black, negative, battery terminal boot. Use supplied 5/16-18 UNC nut and lock washer.
9. Install the battery fuse.





## 4.0 Maintenance and Repair

This section provides preventive maintenance for ADB Safegate LED taxiway and runway signs.

To keep the LED taxiway and runway signs operating efficiently, follow a preventive maintenance schedule. Refer to [Table 3](#).

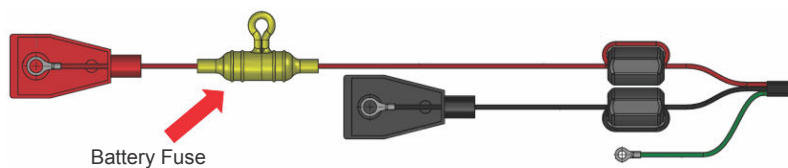
**Table 3: LED Taxiway and Runway Sign Maintenance**

Interval	Maintenance Task	Action
Daily	Check for burned-out LED assemblies.	Check circuit operation.
Monthly	Check for dirty panels.	Clean with mild soap and water.
	Check for vegetation covering panel.	Remove vegetation.
Semi-Annually	Check for loose wire connections.	Tighten wires.
	Check for cracked or deteriorated wires.	Replace wire.
	Check for paint flaking off.	Repaint.
Annually	Check for panels yellowing.	Clean with Formula 409 brand cleaner or similar cleaning agent.
	Check for deteriorated gaskets.	Replace gaskets.

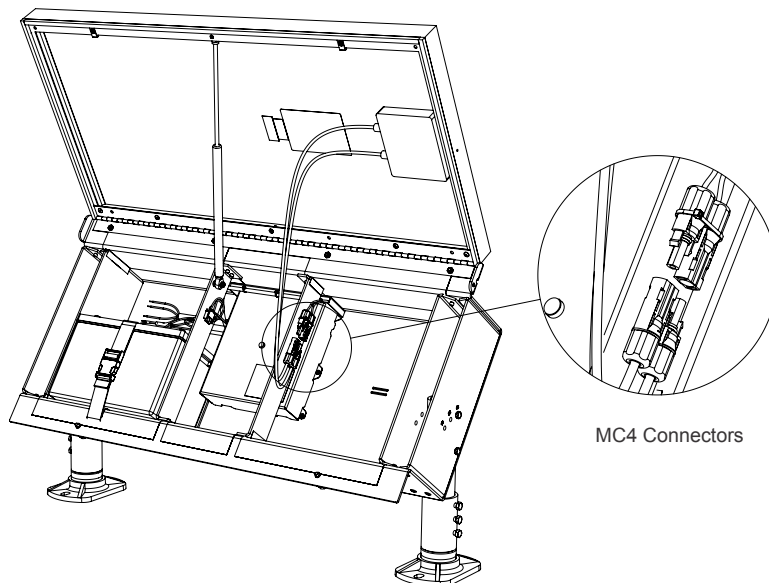
### 4.1 Replacing an LED Light Bar

1. Turn off the power to the sign by performing the following steps:

a) Remove the battery fuse from the SEPS battery harness.



b) Disconnect one of the solar panel MC4 connectors.



2. Remove the sign top cover.

3. Remove the sign face.
  4. Disconnect the power connector from the LED light bar being replaced.
  5. Remove fasteners from light bar being replaced.
  6. Note the orientation of light bar to be replaced in reference to the connectors.
  7. Install the new light bar and replace the fasteners.
- 



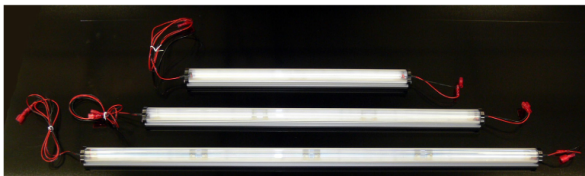
### CAUTION

This equipment contains electrostatic sensitive devices.

- Protect the LED light bar kit from electrostatic discharge.
  - Failure to secure light bar may result in equipment damage.
- 

8. Check that all connections are tight and correct.  
See the LED light bar schematic diagram [Figure 22](#) and [Figure 23](#).
9. Replace the panels, top cover and restore the power to the sign.

**Figure 20: Three Sizes of Light Bars 48A0442/XX**



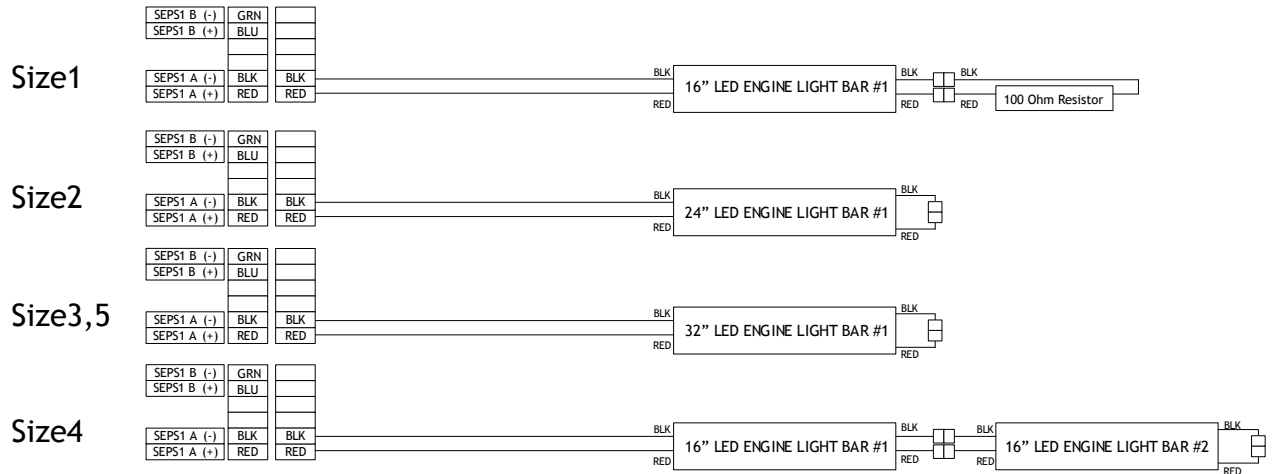
**Figure 21: LED Light Bar Circuit Resistor Assembly 44A6921/5**

50 W, 100 Ohm, 1% Resistor  
Mounted on the top of the top rail  
connected to the last light bar in the  
assembly, if used.

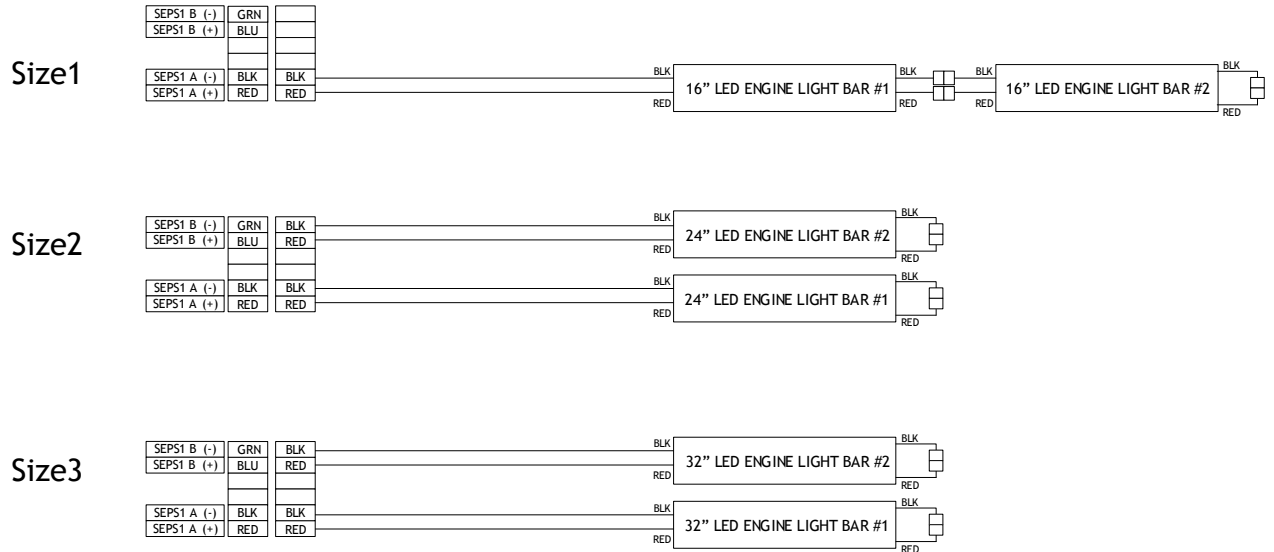


Figure 22: Wiring Diagram for the LED Light Bars 1 Module and 2 Module Signs

### 1 MODULE SIGNS



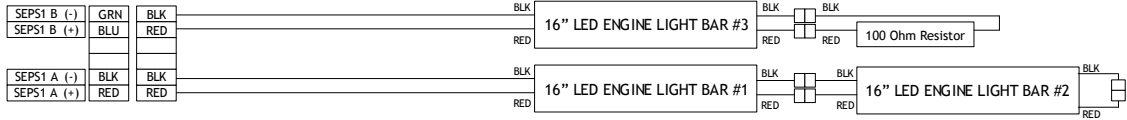
### 2 MODULE SIGNS



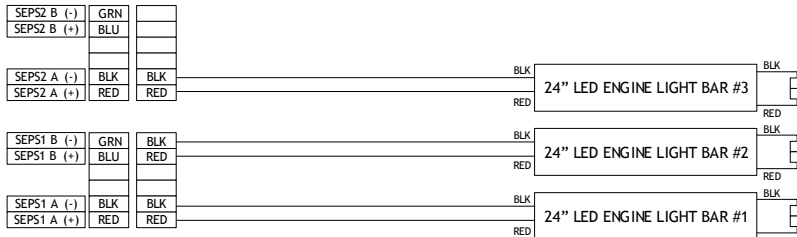
**Figure 23: Wiring Diagram for the LED Light Bars 3 Module and 4 Module Signs**

### 3 MODULE SIGNS

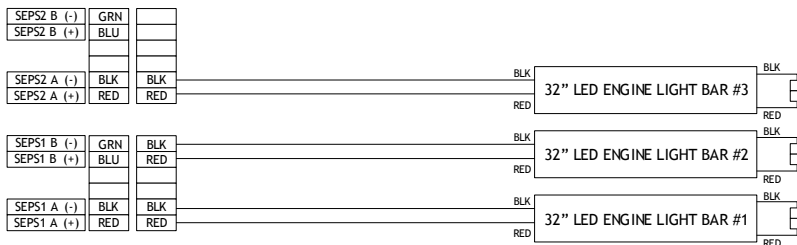
Size1



Size2

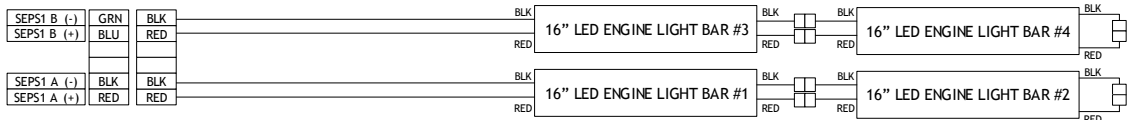


Size3

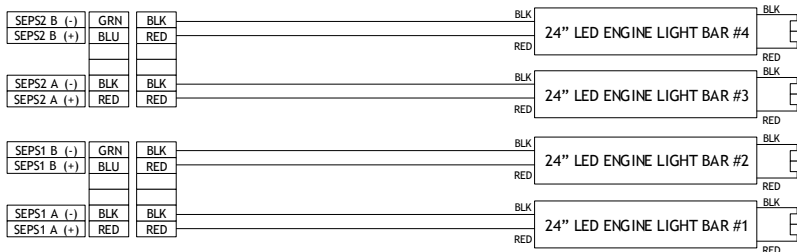


### 4 MODULE SIGNS

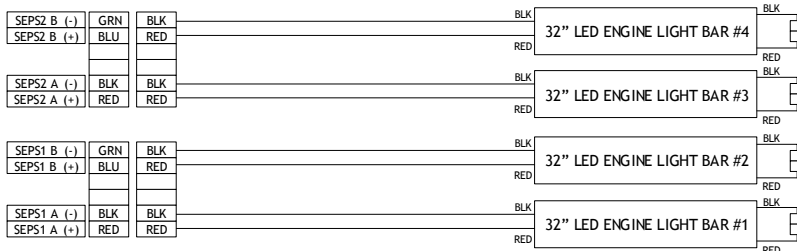
Size1



Size2



Size3



## 4.2 Replacing the Battery



### DANGER

ELECTRICAL SHOCK HAZARD.

DO NOT LET THE BATTERY TERMINALS COME INTO CONTACT WITH ANY EXPOSED METAL.



### WARNING

Batteries are shipped fully charged. Use extreme caution when handling the batteries as they can generate hazardous short-circuit currents.

- Remove all jewelry (bracelets, metal-strap watches, rings) before attempting to handle or remove the battery.
- Be careful not to short battery terminals with tools.



### WARNING

Batteries are heavy. Ensure that you use proper lifting techniques when moving the battery.



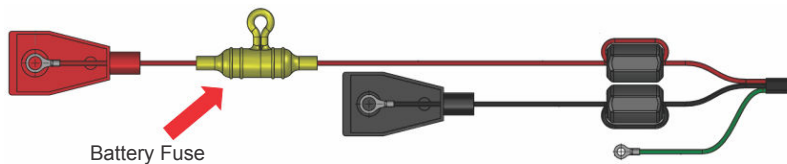
### Note

Do not discard batteries in the garbage – please recycle!

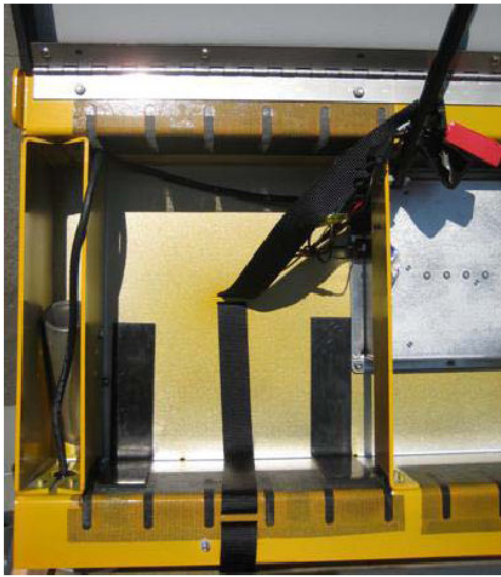
These batteries are rechargeable lead-acid batteries. Consult your local municipal by-laws for information on recycling.

The battery sits in the left hand cavity inside SEPS. To replace the battery:

1. Remove the battery fuse from the SEPS battery harness.



2. Slide back the black, negative, battery terminal boot. Disconnect the negative (-) harness lead.
3. Slide back the red, positive, battery terminal boot. Disconnect the positive (+) harness lead.
4. Release the battery strap buckle and loosen the buckle to the end of the strap.
5. Loop the strap buckle and harness leads above the solar panel's gas shock and out of the way.



6. Pull on the battery's handle to lever the battery up onto the front sill of the SEPS chassis and away from the electrical connections on the EMS. Then lift the old battery clear.



7. Balance the new battery on the bottom lip of the SEPS chassis and then slowly let it drop back into its cavity. Do not let the battery fall backwards or crush any electrical connections.
8. Battery terminals should be closest to you, with the positive (+) on the left and negative (-) on the right.
9. Loop the battery strap under the battery handle. Connect the battery strap buckle. Tighten the battery strap and fold loose end underneath itself.
10. Loop the positive (+) harness lead under the battery handle. Apply anti-corrosion compound (not included) to the terminal. Connect the harness lead to the terminal and slide on the red, positive, battery terminal boot.
11. Loop the negative (-) harness lead under the battery handle. Apply anti-corrosion compound (not included) to the terminal. Connect the harness lead to the terminal and slide on the black, negative, battery terminal boot.
12. Install the battery fuse.

## 4.2.1 Energy Management System (EMS) Recycling

Production of the EMS required the extraction and use of natural resources. The EMS may contain substances that could be harmful to the environment or human health if improperly handled at the product's end of life. In order to avoid release of such substances into the environment and to reduce the use of natural resources, we encourage you to recycle the EMS in an appropriate way that will ensure most of the materials are reused or recycled appropriately. Check your local municipality for electronics recyclers.

## 4.3 Troubleshooting

This section provides troubleshooting information for the Solar Taxiway and Runway LED Signs. The information covers only the most common problems. If you cannot solve the problem with the information given here, contact your local ADB Safegate, Americas representative for help.

**Table 4: Troubleshooting Guide**

Issue	Action
LED Sign will not turn on	Check for obstructed solar panel. The load will only turn on if it is dark or the solar panel is obstructed.
	If SEPS is configured to On-Demand Wireless Mode, the load will only turn on when commanded by the wireless hand-held controller.
	This can be caused by a loose or disconnected wire in the Sign, check for loose wires at the terminal block in the sign and at any wire connections inside the sign.
	This can be caused by a wiring issue, low battery voltage, or a failure of an EMS component (charge controller, LED driver, or LED flasher).
	Check the wiring to the LED fixtures for continuity and make sure the wires are not pinched anywhere. Also check that the wiring polarity is correct on the LED fixtures.
	Check the battery fuse. Replace if necessary with a 15A cartridge style fuse, Littelfuse 0314015 or equivalent.
	Check the battery terminals for signs of corrosion. Clean if necessary and apply a battery terminal anti-corrosion product.
Not all LED bars will turn on	Inspect the indicator LEDs on the EMS charge controller. Remove the EMS cover by unscrewing the thumbscrew and tilting the cover up at the front and sliding it toward you. See charge controller operation manual for indicator LED details.
	Using a voltmeter, measure the battery voltage. Battery voltage should be a minimum of 12 volts, with 12.6 volts being nominal normal voltage. If the voltage is very low, charge or replace the battery and monitor the system for proper operation. Ensure that the solar panel is clean, clear of debris and is not shaded by buildings or vegetation. If the solar panel is covered or shaded, this will prevent proper battery charging.
LED Sign will not turn on at night but works when TEMP or SEQ commands sent from wireless remote.	This can be caused by a damaged or faulty LED bar. Check each LED bar using LED Light Engine Tester 44A7264/1, replace LED bar(s) as necessary.
	This can be caused by a loose or disconnected wire in the Sign, check for loose wires at the terminal block in the sign and at any wire connections inside the sign.
LED Sign will not turn on at night but works when TEMP or SEQ commands sent from wireless remote.	This can be caused by a damaged or faulty LED bar. Check each LED bar using LED Light Engine Tester 44A7264/1, replace LED bar(s) as necessary.
	The charge controller may be in LVD, see charge controller operation manual for details. Ensure that the solar panel is clean, clear of debris and is not shaded by buildings or vegetation. If the solar panel is covered or shaded, this will prevent proper battery charging.

**Table 4: Troubleshooting Guide (Continued)**

Issue	Action
LED Sign will not turn on at night but turns on when the Test button on the charge controller is pressed.	<p>This can be caused by excessive artificial light hitting the solar panel at night preventing the EMS from sensing nightfall. Remove or baffle the source of light so that it doesn't hit the SEPS solar panel or install SEPS in darker location.</p> <p>This can also be caused by the charge controller entering LVD mode. Ensure that the solar panel is clean, clear of debris and is not shaded by buildings or vegetation. If the solar panel is covered or shaded, this will prevent proper battery charging.</p>
Signs will not turn on when Test button pressed.	<p>This can be caused by a wiring problem with the fixtures. Check the wiring to the LED fixtures for continuity and make sure the wires are not pinched anywhere. Also check that the wiring polarity is correct on the LED fixtures.</p> <p>If the unit is in LVD, the Test button will only work three times to avoid damaging the battery. If the system enters LVD after the Test button has been pressed, the load output will turn off. Wait five minutes before pressing the test button again to turn the LED fixture(s) on.</p>
System does not respond to radio control	<p>Remove the cover of the EMS and verify that the "Radio ON" status LED is flashing green. Verify that the "INFRARED" status LED is not on. Inspect the coaxial cable and antenna for damage. Verify that the antenna is fully threaded onto it's the coaxial connector.</p>
Sign is not staying on all night	<p>Verify that the Light Controller rotary setting on the charge controller is set to "D/D". The rotary knob has a small, recessed arrow that is used at the pointer.</p>
No Response to Wireless Hand-Held Controller	<p>If the balance of SEPS is checked to be operational (battery, fuse, load wiring, product orientation, indicators) and the product does not respond to commands from the wireless hand-held controller, check:</p> <p>External antenna is connected and installed properly.</p> <p>Grouping of the loads. Check that you've selected the appropriate group when sending wireless commands. When in doubt, select all groups when sending commands from the wireless hand-held controller.</p> <p>Ensure that both the antenna of SEPS and the wireless hand-held controller are line-of-sight, vertical, and within range.</p>
No Illuminated Indicators	<p>If none of the on-board indicators are illuminated, check the battery fuse.</p>



## 5.0 Parts/Ordering Codes

### Solar Sign

#### Type

R = LED Standard (Mode 2)  
 S = LED High Wind (Mode 3)<sup>1</sup>

#### Sign Size

1 = Size 1  
 2 = Size 2  
 3 = Size 3  
 4 = Size 4  
 5 = Size 5

#### Modules

1 = 1 Module<sup>2</sup>  
 2 = 2 Modules<sup>2</sup>  
 3 = 3 Modules<sup>2,3</sup>  
 4 = 4 Modules<sup>2,3</sup>

#### Style

S = Solar

#### Face

1 = Single  
 2 = Double

#### Total Number of Panels

X = To be determined by the ADB Safegate sales department based on legend and module configurations.

3

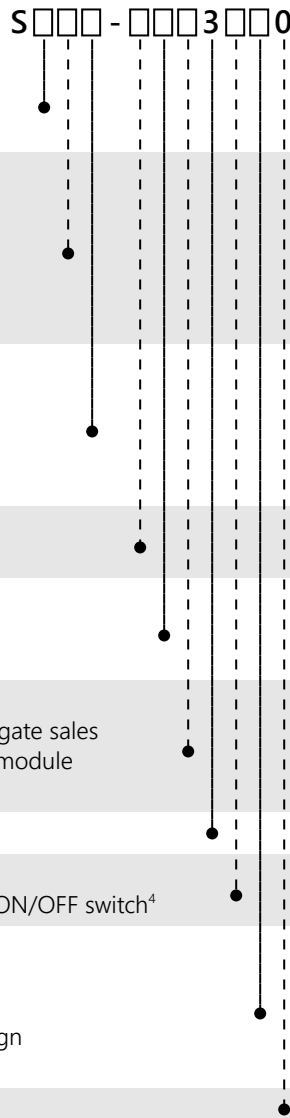
#### Power

C = Solar power through side without ON/OFF switch<sup>4</sup>

#### Tether

0 = No tether  
 1 = One tether, one end of sign  
 2 = Two tethers, one on each end of sign  
 3 = One tether on all legs

0



#### Notes

- Customer to provide legend information and power connection side. It is important to match power cord exit location with legend side.
- High Wind signs require 4-bolt high wind mounting flanges, except size 1 signs which require 2-bolt mounting flanges.
- One SEPS is required to power (size 1 signs with 1, 2, 3, or 4 modules), (size 2 and 3 with 1 or 2 modules), (size 4 and 5 with 1 module).
- Two SEPS are required to power (size 2 and 3 signs with 3 or 4 modules).
- Cord set not provided. Cable gland is provided for side entry.

### LED Light Engine Tester

44A7264/1

Battery-powered tester is used during maintenance activities to separately test a single LED light bar. Uses four size D batteries and outputs 350 mA. Output is activated using a momentary switch.

### STD Legend Panel Replacement 44A6084 /

**Size**

- 1 = Size 1<sup>1</sup>
- 2 = Size 2
- 3 = Size 3 and 5
- 4 = Size 4

**Number of Modules**

- 1 = 1 module
- 2 = 2 modules

**Panel Type**

- 1 = With legend (retroreflective)
- 2 = Black

**Sign Type**

- 0 = Standard (Mode 2)

**Notes**

- <sup>1</sup> For size 1 standard and high-wind signs, use 44A6084-XXX0 standard panels.

### HW Legend Panel Replacement 44A7777 /

**Size**

- 2 = Size 2
- 3 = Size 3 and 5
- 4 = Size 4

**Number of Modules**

- 1 = 1 module
- 2 = 2 modules

**Panel Type**

- 1 = With legend (retroreflective)
- 2 = Black

**Sign Type**

- 1 = High-Wind (Mode 3)<sup>1</sup>

**Notes**

- <sup>1</sup> For size 1 high-wind signs, use 44A6084-XXX0 standard panels.

### Legend Panel Divider 44A6173 /

**Size**

- 1 = Size 1
- 2 = Size 2
- 3 = Size 3 and 5

**Paint Coverage**

- A = Solid black<sup>1</sup>
- C = Clear front (paint back side only)

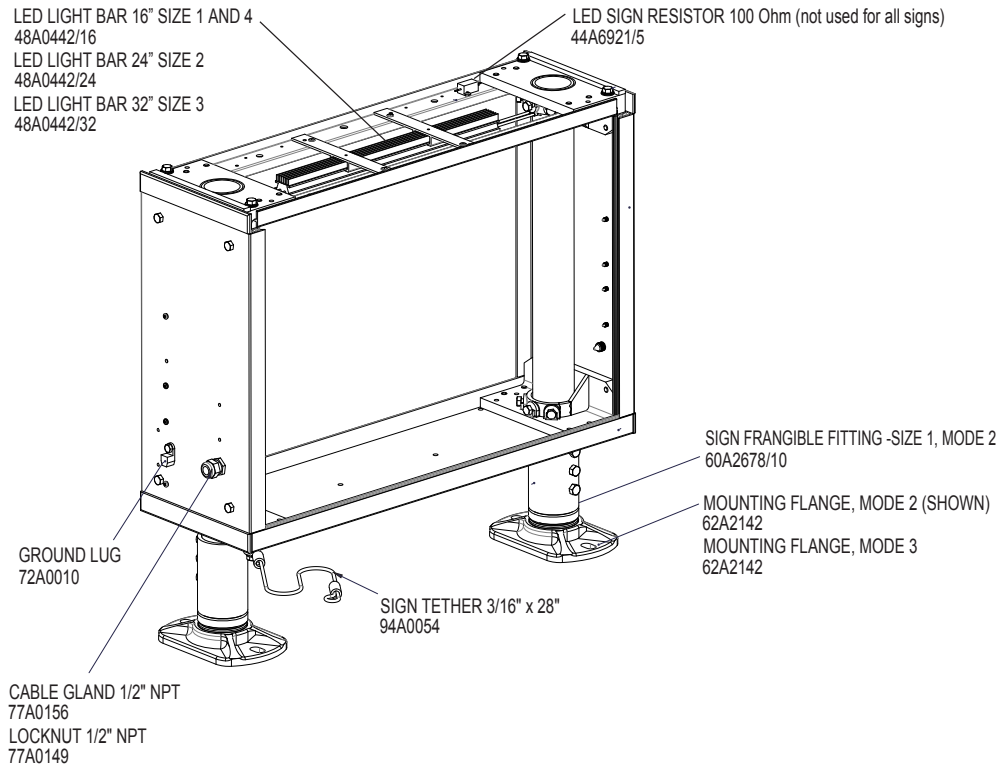
**Paint Color**

- R = Red
- Y = Yellow
- B = Black<sup>1</sup>

**Notes**

- <sup>1</sup> For Paint Coverage (Solid black), Paint Color (Black) must be selected.

**Figure 24: Solar Sign Parts**



## 5.1 Spare Parts

**Table 5: Parts**

Description	Part No.
Mounting Flange (2-bolt)	62A2142
Mounting Flange (4-bolt)	62A2146
Frangible coupling, size 1	60A2678/10 (Mode 2), 60A2678/30 (Mode 3)
Frangible coupling, size 2	60A2678/20 (Mode 2), 60A2678/50 (Mode 3)
Frangible coupling, size 3 or 5	60A2678/40 (Mode 2), 60A2678/31 (Mode 3)
Frangible coupling, size 4	60A2678/40 (Mode 2), 60A2678/41 (Mode 3)
Tether	94A0054
LED light engine (bar), Size 1 and 4	48A0442/16
LED light engine (bar), Size 2	48A0442/24
LED light engine (bar), Size 3	48A0442/32
LED Sign Resistor 100 Ohm	44A6921/5
Cable Gland 1/2" NPT	77A0156
Locknut (for Cable Gland) 1/2" NPT	77A0149
Terminal Block with Bracket (1 Terminal Block)	44A7124/10
Terminal Block with Bracket (2 Terminal Blocks)	44A7124/20







## Powering Your Airport Performance from Approach to Departure

[adbsafegate.com](https://adbsafegate.com)

Copyright © ADB SAFEGATE, all rights reserved

