AGSF-L LED Airfield Guidance Sign

FAA L-858(L)

User Manual

96A0455, Rev. L, 2025-11-20

ADB SAFEGATE

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 C22.2 No.180:13 (R2018) regulations. The CSA 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 below, 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 furthers 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.

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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 applicable sales agreement 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.

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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 this 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 symbols 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.
	ELECTROSTATIC SENSITIVE DEVICES This equipment may contain electrostatic devices.

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 these instructions can result in serious injury, death 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.
- CSA – C22.2 No.180:13 (R2018), series isolating transformers for airport lighting.
- 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 Material Handling: Heavy Equipment

DANGER

UNSTABLE LOAD
USE CAUTION WHEN MOVING HEAVY EQUIPMENT

- USE EXTREME CARE WHEN MOVING HEAVY EQUIPMENT.
- VERIFY THAT THE MOVING EQUIPMENT IS RATED TO HANDLE THE WEIGHT.
- WHEN REMOVING EQUIPMENT FROM A SHIPPING PALLET, CAREFULLY BALANCE AND SECURE IT USING A SAFETY STRAP.

FAILURE TO FOLLOW THIS INSTRUCTION CAN RESULT IN DEATH, SERIOUS INJURY, OR EQUIPMENT DAMAGE

1.1.5 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 serious injury, death or equipment damage.

1.1.6 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 OR REPLACE MALFUNCTIONING COMPONENTS ACCORDING TO INSTRUCTIONS PROVIDED IN MANUAL.

FAILURE TO FOLLOW THESE INSTRUCTIONS CAN RESULT IN DEATH OR EQUIPMENT DAMAGE

1.1.7 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

1.1.8 Arc Flash and Electric Shock Hazard

DANGER

SERIES CIRCUITS HAVE HAZARDOUS VOLTAGES
THIS EQUIPMENT PRODUCES HIGH VOLTAGES TO MAINTAIN THE SPECIFIED CURRENT - DO NOT DISCONNECT WHILE ENERGIZED.

- ALLOW ONLY QUALIFIED PERSONNEL TO PERFORM MAINTENANCE, TROUBLESHOOTING, AND REPAIR TASKS.
- ONLY PERSONS WHO ARE PROPERLY TRAINED AND FAMILIAR WITH ADB SAFEGATE EQUIPMENT ARE PERMITTED TO SERVICE THIS EQUIPMENT.
- AN OPEN AIRFIELD CURRENT CIRCUIT IS CAPABLE OF GENERATING >5000 VAC AND MAY APPEAR OFF TO A METER.
- NEVER UNPLUG A DEVICE FROM A CONSTANT CURRENT CIRCUIT WHILE IT IS OPERATING; ARC FLASH MAY RESULT.
- DISCONNECT AND LOCK OUT ELECTRICAL POWER.
- ALWAYS USE SAFETY DEVICES WHEN WORKING ON THIS EQUIPMENT.
- FOLLOW THE RECOMMENDED MAINTENANCE PROCEDURES IN THE PRODUCT MANUALS.
- DO NOT SERVICE OR ADJUST ANY EQUIPMENT UNLESS ANOTHER PERSON TRAINED IN FIRST AID AND CPR IS PRESENT.
- CONNECT ALL DISCONNECTED EQUIPMENT GROUND CABLES AND WIRES AFTER SERVICING EQUIPMENT. GROUND ALL CONDUCTIVE EQUIPMENT.
- USE ONLY APPROVED ADB SAFEGATE REPLACEMENT PARTS. USING UNAPPROVED PARTS OR MAKING UNAPPROVED MODIFICATIONS TO EQUIPMENT MAY VOID AGENCY APPROVALS AND CREATE SAFETY HAZARDS.
- CHECK THE INTERLOCK SYSTEMS PERIODICALLY TO ENSURE THEIR EFFECTIVENESS.
- DO NOT ATTEMPT TO SERVICE ELECTRICAL EQUIPMENT IF STANDING WATER IS PRESENT. USE CAUTION WHEN SERVICING ELECTRICAL EQUIPMENT IN A HIGH-HUMIDITY ENVIRONMENT.
- USE TOOLS WITH INSULATED HANDLES WHEN WORKING WITH AIRFIELD ELECTRICAL EQUIPMENT.

FAILURE TO FOLLOW THESE INSTRUCTIONS CAN RESULT IN DEATH OR EQUIPMENT DAMAGE

2.0 Introduction

The ADB Safegate AGSF-L LED Airfield Guidance Sign is designed to be long lasting, energy efficient, and trouble free. It is certified for the FAA market (AC 150/5345-44 and EB No. 67D). The robust design and energy efficient LED technology significantly reduces maintenance and eliminates runway shutdowns. The sign is equipped with a shorted LED detection PCB which is designed to continuously monitor and detect if a loss of LED voltage occurs within the sign. In accordance with Engineering Brief No. 67D, if a loss of LED voltage occurs, the shorted LED detection PCB will turn off the LEDs indicating maintenance is required for this sign.

2.1 FAA LED Airfield Guidance Sign

Compliance with Standards

FAA:	L-858Y(L), L-858R(L), L-858L(L), L-858H(L), and L-858B(L) AC 150/5345-44 (Current Edition) and the FAA Engineering Brief No. 67. ETL Certified.

Uses

FAA L-858Y(L)

Informational Direction, Destination, and Boundary Signs - Black inscription on a yellow background. Designed to guide pilots to a particular point on the airfield by identifying runway exits, taxiway directions, taxiway intersections, taxiway ending, and inbound/ outbound destinations, boundaries.

FAA L-858R(L)

Mandatory Instruction Signs - White inscription with black outline on a red background. Designed to identify holding positions, runway intersections, and prohibit aircraft entry into designated areas.

FAA L-858L(L)

Runway and Taxiway Location Signs - Yellow inscription on a black background with a yellow border. Designed to identify taxiway and runway location on which the aircraft is located.

FAA L-858B(L)

Runway Distance Remaining Signs - White inscription on a black background. Designed to provide runway distance remaining information to pilots during takeoff and landing operations. Inscriptions are descending numerals used at 1,000-foot intervals adjacent to the runway edge.

FAA L-858H(L)

One-Half Runway Distance Remaining Signs - White inscription on a black background. Designed to identify the point on the runway where one-half the takeoff distance remains. For use with unpaved runways less than 3,000 feet in length.

Operating Conditions

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

Features

- Long lasting LEDs virtually eliminate runway and taxiway shutdowns.
- LED technology virtually eliminates re-lamping and maintenance costs.
- Energy efficient custom designed LED light bars reduce operation utility cost.
- Robust design reduces maintenance cost and maximizes Mean Time Between Failures MTBF.
- Easy access to components for easy maintenance and troubleshooting.
- Uniform light distribution provides a more vibrant better-looking sign.
- Eliminates hot spots and shadows compared to halogen signs.
- Built-in shorted LED detection ensures safe illumination and compliance with FAA Engineering Brief No. 67D.
- Compatible with ferroresonant and thyristor CCRs in compliance with FAA and IEC requirements.
- Provides constant illumination on all CCR steps 2.8 - 6.6 A.
- Operates on all steps of a 3-step, 5-step, and 1-step CCRs.
- Regulated low-voltage DC electronics inside the sign for increased safety.
- Rugged lightning protection complies with FAA Engineering Brief No. 67D and ANSI/IEEE C62.41-1991 Location Category C2.
- Direct replacement for ADB Safegate AGSF series halogen signs.
- Continuous frame design provides fast installation with less mounting legs and less tethers.

Construction

Extremely durable and corrosion-resistant sign design requires minimal maintenance.

- Non-ferrous aluminum frame and mounting
- Stainless-steel hardware
- Impact resistant modified acrylic legend panels
- Retroreflective sheeting

Electrical Supply

Signs are internally lighted and are connected to a series circuit using the appropriately-sized 50 or 60 Hz L-830/L-831 isolation transformer.

Sign Load & Transformer Requirements

		Style 2: 3-Step (4.8-6.6A)			Style 3: 5-Step (2.8-6.6A)			Style 5: 1-Step (5.5A)		
Size	Module	Isolation Transformer	Power Factor	VA	Isolation Transformer	Power Factor	VA	Isolation Transformer	Power Factor	VA
1	1	100 W	0.90	73	100 W	0.90	73	100 W	0.91	61
1	2	100 W	0.91	79	150 W	0.87	86	100 W	0.91	67
1	3	100 W	0.91	86	150 W	0.91	90	100 W	0.92	75
1	4	100 W	0.90	75	150 W	0.87	82	100 W	0.91	64
2	1	100 W	0.91	77	100 W	0.91	77	100 W	0.91	65
2	2	100 W	0.91	86	150 W	0.91	90	100 W	0.92	75
2	3	100 W	0.91	82	150 W	0.91	84	100 W	0.92	70
2	4	100 W	0.91	93	300 W	0.89	98	100 W	0.92	80
3	1	100 W	0.91	79	150 W	0.87	86	100 W	0.91	67
3	2	100 W	0.90	75	150 W	0.87	82	100 W	0.91	64
3	3	100 W	0.91	93	300 W	0.89	98	100 W	0.92	80
3	4	150 W	0.92	111	300 W	0.88	124	150 W	0.92	98
4	1	100 W	0.91	79	150 W	0.87	86	100 W	0.91	67
5	1	100 W	0.91	79	150 W	0.87	86	100 W	0.91	67

Note

- VA values represent the actual load imposed on the regulator and accounts for power factor and isolation transformer load. The VA load and power factor is measured on the primary side of the isolation transformer.

LED Retrofit Kits for Halogen and Fluorescent Signs

Application

A retrofit kit is available to convert any existing ADB Safegate AGSF-H tungsten-halogen or AGSF-F sign to an LED light source. The same retrofit kit can be used to convert signs using LED light tubes (Part No. 48A0408 and 48A0409) to the new LED light bar design.
It typically takes 20 minutes to retrofit a 2-module sign. The retrofit process converts the sign to the same type as an existing ADB Safegate ETL-Certified sign.

Reduced Maintenance costs

A LED sign virtually eliminates runway and taxiway shutdowns due to the long life LED light source. It eliminates re-lamping expenses and reduces on-going maintenance costs. The LED optical design also creates a highly uniform distribution of light, eliminating hot spots and shadows. Also, the sign provides for improved safety because there is only a low, regulated DC voltage inside sign.

Energy savings

A LED sign provides greatly reduced energy consumption compared to halogen signs. For more information, see Table 1.

The LED sign operates on ferroresonant or thyristor CCRs that are designed in compliance with FAA requirements. The sign electronics are designed to operate on 3-step, 5-step, and 1-step series circuits.

See Sign Load & Transformer Requirements section for sign loading and optimum sign transformer size. Note that the existing larger size transformer, if present, can be reused.

See www.adbsafegate.com for Service Bulletin ALN158 with details on how to retrofit a sign to LED light bars.

Table 1: LED and Halogen Sign Comparison Table

Size	Modules	Style	Transformer	VA	Energy Savings
1	4	Style 3 (5-step)	100 W (LED) 500 W (Halogen)	75 (LED) 233 (Halogen)	70%
2	3	Style 2 (3-step)	100 W (LED) 500 W (Halogen)	79 (LED) 340 (Halogen)	77%
3	3	Style 2 (3-step)	150 W (LED) 500 W (Halogen)	94 (LED) 340 (Halogen)	72%

Sign Dimensions and Weights

Height - Inches (Centimeters)			
Size	**Sign Face Height**	**Legend Height**	**Overall Mounting Height**
1	18 (45.7)	12 (30.5)	27.3 (69.3)
2	24 (61)	15 (38.1)	33.3 (84.5)
3	30 (76.2)	18 (45.7)	39.3 (99.8)
4	48 (122)	40 (101.6)	55.7 (141.5)
5	30 (76.2)	25 (63.5)	39.3 (99.8)

Length - Inches (Centimeters)				
Size	**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	**1 Module**	**2 Module**	**3 Module**	**4 Module**
1	34 x 33 x 13 (87 x 84 x 33)	34 x 65 x 13 (87 x 165 x 33)	34 x 92 x 13 (87 x 234 x 33)	34 x 130 x 13 (87 x 330 x 33)
2	40 x 40 x 13 (102 x 102 x 33)	40 x 78 x 13 (102 x 198 x 33)	40 x 118 x 13 (102 x 300 x 33)	40 x 156 x 13 (102 x 396 x 33)
3	46 x 46 x 13 (117 x 117 x 33)	46 x 92 x 13 (117 x 234 x 33)	46 x 138 x 13 (117 x 351 x 33)	46 x 184 x 13 (117 x 467 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)								
	Mode 2				**Mode 3**			
Size	**1 Module**	**2 Module**	**3 Module**	**4 Module**	**1 Module**	**2 Module**	**3 Module**	**4 Module**
1	46 (21)	78 (35)	115 (52)	169 (77)	50 (23)	94 (43)	126 (57)	183 (83)
2	71 (32)	104 (47)	153 (70)	220 (100)	79 (36)	117 (53)	172 (78)	244 (111)
3	81 (37)	131 (60)	199 (90)	252 (114)	89 (40)	144 (65)	218 (99)	276 (125)
4	122 (56)	N/A	N/A	N/A	132 (60)	N/A	N/A	N/A
5	81 (37)	N/A	N/A	N/A	89 (40)	N/A	N/A	N/A

Note

- Sign depth is 9.4 in (23.9 cm). See www.adbsafegate.com for additional installation information.
- Sign face height and legend height are specified as the FAA minimum requirements. Actual heights may vary within allowable tolerances.

3.0 Installation

This section provides instructions for installing L-858(L) taxiway and runway signs. Refer to the airport project plans and specifications for specific installation instructions and FAA AC 150/5340-30.

WARNING

Read installation instructions in their entirety before starting installation.

- Refer to the FAA Advisory Circular AC 150/5340-26, 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.
- 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 an L-823 Cord Set, Frangible Couplings, Mounting Flanges, and Tethers. It is recommended that the sign is mounted onto a concrete pad. Mounting hardware is contractor supplied.

3.1 Unpacking

Upon receipt, inspect the carton and note any exterior damage that might indicate damaged equipment. Unpack the carton and check the contents and their condition. If you note any damage to equipment, file a claim with the carrier. The carrier may need to inspect the equipment.

The equipment is shipped ready for installation. Handle the equipment carefully to prevent component damage.

3.2 Power Entry and Mounting Configurations

This section provides information on a variety of power entry and mounting configurations.

The FAA specifies that there must be no above ground power cable connections to signs, and power to a sign or sign array must be provided through breakaway cable connectors installed within the frangible point portion of the sign's mounting legs.

3.2.1 Power Through Leg - Remote Mounting (Preferred - FAA)

Figure 1 shows details for installations with power through the leg with remote mounting. This is the preferred mounting configuration for airfield guidance signs. Refer to Table 2 for parts and information.

Figure 1: Power Through Leg - Remote Mounting (Preferred - FAA)

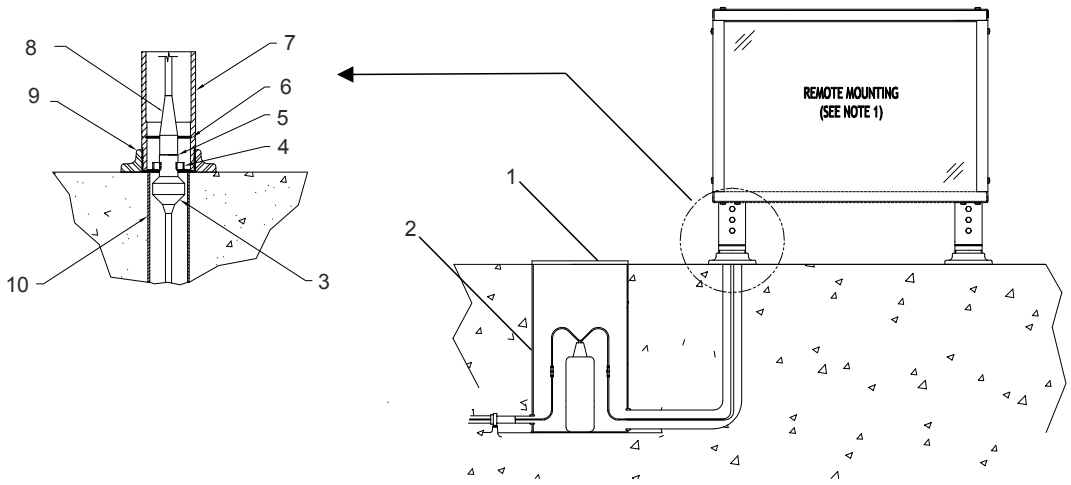


Table 2: Power Through Leg - Remote Mounting (Preferred - FAA)

Item	Description	Part Number	Note
1	L-867B blank cover, 3/8 in thick	Contact ADB SAFEGATE	Ordered separately
2	L-867B base can	Contact ADB SAFEGATE	Ordered separately
3	L-823 Extension cord (style 1, style 7)	73A0108/X	X is length in feet 8ft (2.4 m) is the typical length used
4	Cable clamp	60A2851	Ordered separately
5	End of 73A0108/X must be located at +0/-1 in from coupling frangible point		
6	Frangible point on coupling		
7	Frangible coupling	60A2678/XX	Supplied with sign
8	L-823 cordset	73A0107/72	Supplied with sign
9	Mounting flange	62A2142	Supplied with sign
10	2-inch conduit Top to be flush with top surface of concrete pad		

3.2.2 Power Through Leg - Shallow Base Mounting (Alternate - FAA)

Figure 2 shows detail for installations with power through the leg in the case of shallow base remote mounting. This is a preferred alternative mounting configuration for airfield guidance signs. Refer to Table 3 for parts and information.

Figure 2: Power Through Leg - Shallow Base Mounting (Alternate - FAA)

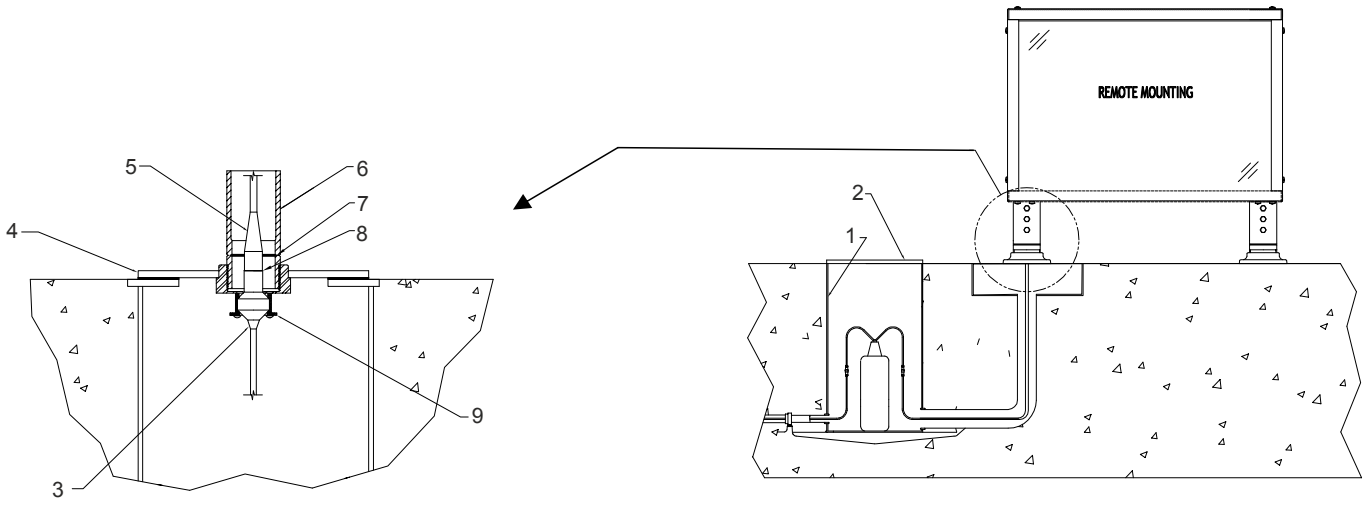


Table 3: Power Through Leg - Shallow Base Mounting (Alternate - FAA)

Item	Description	Part Number	Note
1	L-867B base can	Contact ADB SAFEGATE	Ordered separately
2	L-867B blank base plate, 3/8 in thick with gasket	Contact ADB SAFEGATE	Ordered separately
3	L-823 Extension cord (style 1, style 8)	73A0109/X	X is length in feet, 8ft (2.4 m) is the typical length used.
4	L-867B heavy base plate, 3/8 in thick with gasket, 2 1/2-8 NPS hub	1832BSPLT	Ordered separately
5	L-823 cordset	73A0107/72	Supplied with sign

Table 3: Power Through Leg - Shallow Base Mounting (Alternate - FAA)

Item	Description	Part Number	Note
6	Frangible coupling	60A2678/XX	Supplied with sign
7	Frangible point on coupling		
8	End of 73A0109/X must be located at +0/-1 in from coupling frangible point		
9	Cable clamp		Supplied with base plate

Note

Remove the sign flange provided with the sign and screw the frangible coupling directly into the 2-1/2" hub on the base plate.

3.2.3 Power Through Leg - Direct Mounting (Alternate - FAA)

Figure 3 shows details for installations with power through the leg with direct mounting onto a base plate. Refer to Table 4 for parts and information.

Figure 3: Power Through Leg - Direct Mounting (Alternate - FAA)

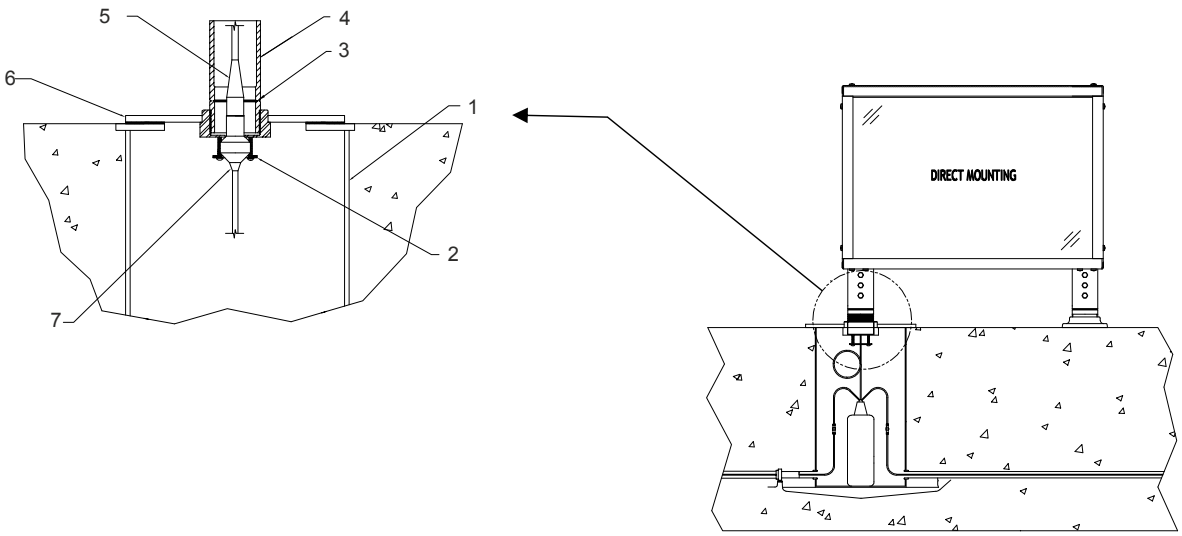


Table 4: Power Through Leg - Direct Mounting (Alternate - FAA)

Item	Description	Part Number	Note
1	L-867B base can	Contact ADB SAFEGATE	Ordered separately
2	Cable clamp		Supplied with base plate
3	Frangible point on coupling		
4	Frangible coupling	60A2678/XX	Supplied with sign
5	L-823 cordset	73A0107/72	Supplied with sign
6	L-867B heavy base plate, 3/8 in thick with gasket, 2 1/2-8 NPS hub	1832BSPLT	Ordered separately
7	Transformer secondary		

Note

Remove the sign flange provided with the sign and screw the frangible coupling directly into the 2-1/2" hub on the base plate.

3.2.4 Power Through Side Panel - Without Flexible Conduit (Not FAA Compliant)

Figure 4 shows details for installations with power entry through the side panel (without flexible conduit). Refer to Table 5 for parts and information.

Figure 4: Power Through Side Panel - Without Flexible Conduit (Not FAA Compliant)

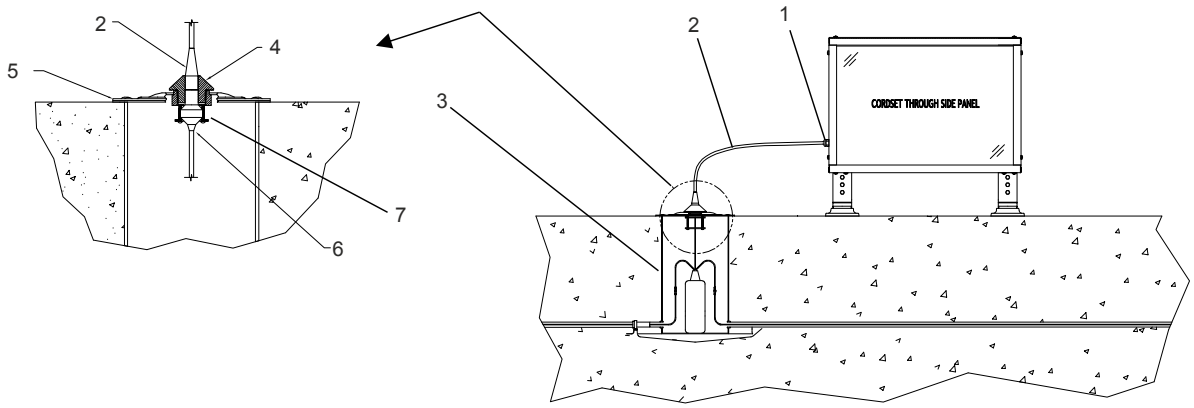


Table 5: Power Through Side Panel - Without Flexible Conduit (Not FAA Compliant)

Item	Description	Part Number	Note
1	Strain relief	77A0156 (Fitting) 77A0149 (Nut)	Supplied with sign
2	L-823 cord set	73A0107/72	Supplied with sign
3	L-867B base can	Contact ADB SAFEGATE	Ordered separately
4	Weather plug	63B0550	Ordered separately
5	L-867B base plate with gasket, 2-11.5 NPS hub	1932	Ordered separately
6	Transformer secondary		
7	Cable Clamp		Supplied with base plate

3.2.5 Power Through Side Panel - With Flexible Conduit (Not FAA Compliant)

Figure 5 shows detail for installations with power entry through the side panel (with flexible conduit). Refer to Table 6 for parts and information.

Figure 5: Power Through Side Panel - With Flexible Conduit (Not FAA Compliant)

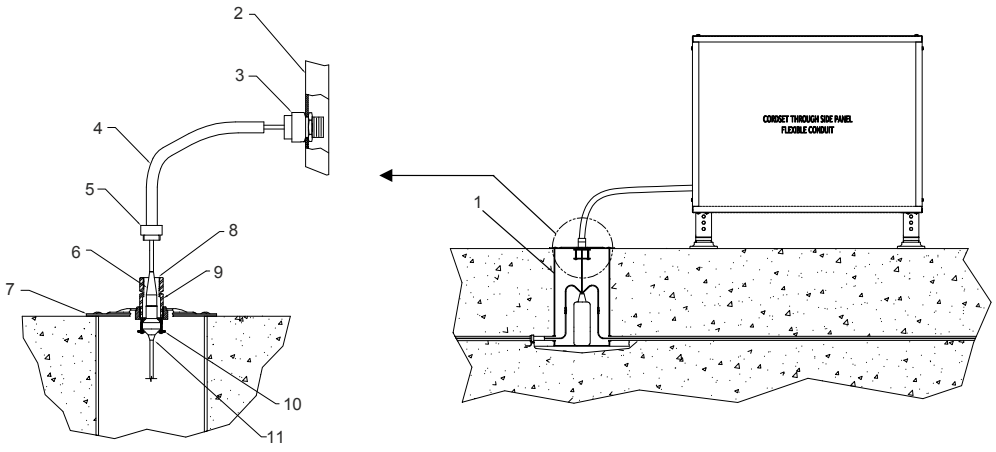


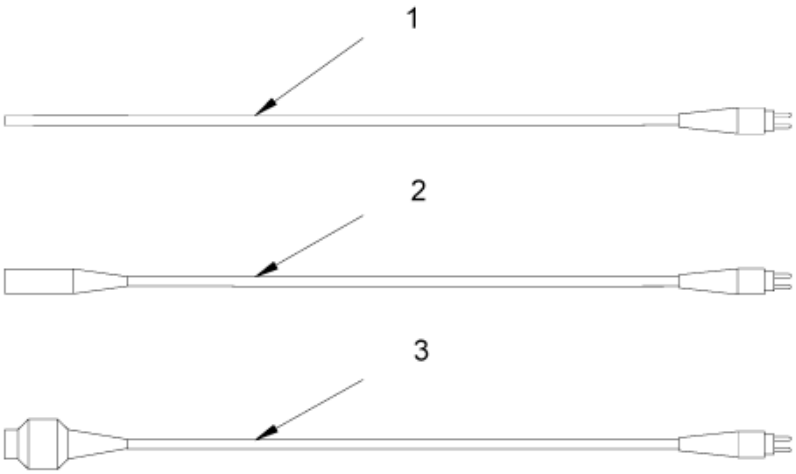
Table 6: Power Through Side Panel - With Flexible Conduit (Not FAA Compliant)

Item	Description	Part Number	Notes
1	L-867B base can	Contact ADB Safegate	Ordered separately
2	Sign side panel		
3	3/4 in conduit male straight connector		Contractor supplied. Fit 7/8 in hole on the sign or enlarge the hole to fit the connector
4	3/4 in conduit		Contractor supplied
5	3/4 in conduit male straight connector, with 1 1/2-11.5 NPT male thread		Contractor supplied
6	L-823 cord set[1]	73A0107/72	
7	L-867B base plate with gasket, 2-11.5 NPS hub	1932	
8	Frangible coupling	62B0499	Ordered separately
9	Frangible point on coupling		
10	Cable clamp		Supplied with base plate
11	Transformer secondary		

3.2.6 Cord sets and Extension Cords

This section provides information on L-823 cord sets and extension cords commonly used with the AGSF-L LED Airfield Guidance Sign. See Figure 6 and refer to Table 7 for cord set and extension cord types and part codes.

Figure 6: L-823 Cord set and Extension Cords



[1] Cord set length external to the sign:

- Size 1 = 47 in.
- Size 2 = 41 in.
- Size 3 = 35 in.
- Size 4 = 18 in.
- Size 5 = 35 in.

For longer length cord-sets, contact ADB Safegate sales department.

Table 7: Cord set and Extension Cord Length

Item	Receptacle Style	Plug Style	Description	Part Number
1	Bare wire	Type II, Class A, Style 1	L-823 cord set, 16/2 wire, 4 ft (1.2 m)	73A0107/48
			L-823 cord set, 16/2 wire, 6 ft (1.8 m)	73A0107/72
2	Type II, Class A, Style 7	Type II, Class A, Style 1	L-823 extension cord, 16/2 wire, 8 ft (2.4 m)	73A0108/8
3	Type II, Class A, Style 8	Type II, Class A, Style 1	L-823 extension cord, 16/2 wire, 8 ft (2.4 m)	73A0109/8

3.3 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 and FAA AC 150/5340-18.
- FAILURE TO INSTALL AND LEVEL THE SIGN AS DESCRIBED IN THE VARIOUS SUBSECTIONS BELOW WILL VOID THE WARRANTY

3.3.1 Installation

The signs are mounted on a concrete slab, concrete pedestals, or angle iron stakes so the top of the sign is level. The concrete edges or stakes may not protrude above grade. Signs are oriented so that the face is perpendicular to the centerline of the taxiway or runway. For special situations for improved visibility, single-sided signs may be canted. Power to the signs is provided through breakaway cable connectors installed within the frangible coupling portion of the sign's mounting legs. Auxiliary equipment, such as isolation transformers or series circuit power adapter units, is installed below ground level in an L-867 base can. See AC 150/5340-30, Design and Installation Details for Airport Visual Aids, for installation details.

3.3.2 Choosing a Sign Size

When selecting a sign size, take into account factors such as effectiveness, aircraft clearance, jet blast, and snow removal operations. Normally, the larger the sign and the closer it is located to the runway or taxiway edge, the more conspicuous and effective it is. However, aircraft clearance requirements and jet blast effects require signs to be located at further distances from the runway or taxiway edge, requiring larger signs to be more conspicuous and effective. Also, the effects of snow removal operations should be considered in the choice of sign size and location.

Note

Check site plans and specifications for the location of the power leg (leg where the L-823 cord set is located) in reference to the L-867 light base. Typically, the L-867 base can is located near the power leg. ADB Safegate' signs are shipped with the sign product label attached to the sign end where the power leg is located. In addition, verify that the sign legend is orientated correctly to the taxiway or runway per the site plans when the sign is installed on the pad. If the sign legend location is not correct, then the panels must be removed and reinstalled in the sign in the correct location.

3.3.3 Sign Distance from Pavement Edge

Refer to Table 8 for the distance of signs from the pavement edge. Refer to AC 150/5340-18 for more information on the location of different types of Airfield Guidance signs.

Table 8: Recommended Sign Distance from Pavement Edge

Sign Size	Distance from Pavement (ft.)	Distance from Pavement (m)
1	10-20	3-6
2	20-35	6-10.5
3	35-60	10.5-18

Table 8: Recommended Sign Distance from Pavement Edge

Sign Size	Distance from Pavement (ft.)	Distance from Pavement (m)
4	50-75	15-22.5
5	10-15 from runway edge[1]	3-4.6 from the runway edge[1]

3.3.4 Sign Installation on a Concrete Pad

Note
Follow site plans and specifications for concrete dimensions. Refer to FAA AC 150/5340-30, for concrete pad design.

Note
Anchor bolts (contractor supplied) must be a minimum of 1.25 inches (31.75 mm) above the top surface of the concrete pad to attach the mounting flanges. Hilti Quick Bolts (wedge-bolt) or Red Head Trubolt Wedge Anchors are recommended (contractor supplied). Check with the anchor-bolt manufacturer for their recommendations as applied to your airport site.

Figure 7: Example Hilti Kwik Bolt 3 Standard Thread 304 Stainless Steel

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 8: Mode 2 Mounting Flange 62A2142

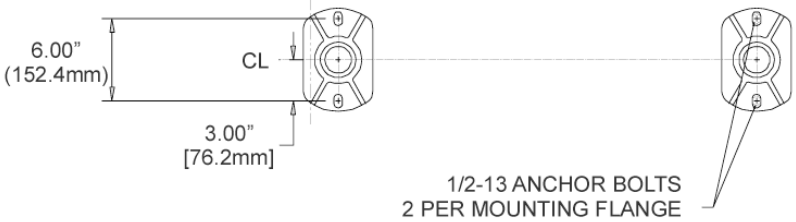
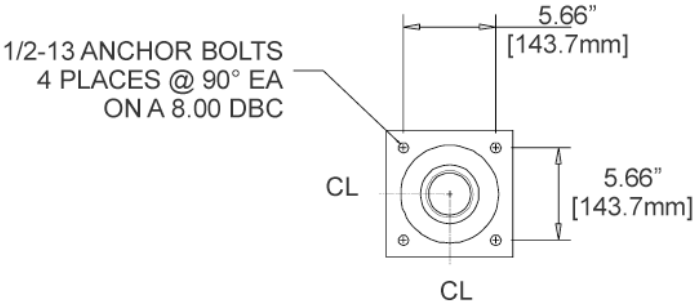


Figure 9: Mode 3 Mounting Flange 62A2146



[1] For one-half runway distance remaining signs position the sign 10-15 ft (3-4.6 m) from the runway edge.

3.3.5 Sign Mounting

Note

Signs are fully 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 ensure the assembly is flat, perform the following procedure:

1. Set the sign 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 enure 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 10 . 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.

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 Engineering.

Figure 10: Sign Frangible Coupling

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. Connect a ground wire to the earth ground lug located on the side of the sign.
   Refer to Figure 19 for electrical connections for series circuit installation.

CAUTION

- Lock out power before making any electrical connections. Failure to observe this warning may result in personal injury, death, or equipment damage.

4. Attach tether.
   See Tethers for more information.
5. Connect the L-823 cord set to the series circuit transformer.

6. Reinstall panels (if removed) and top lid (if removed).

3.4 Wiring

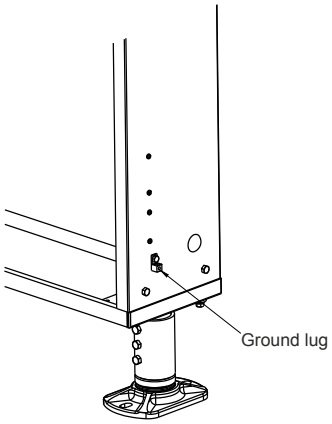
When installing cable, follow the guidelines below.

- Install all cable for direct earth burial or for placement in duct according to 150/5370-10 as appropriate.
- Operate the signs as a part of a series lighting system. The signs are connected into the series circuit by means of an isolation transformer.

3.5 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.



Connect a minimum 12 AWG ground wire to the earth ground lug located on the outside of the side panel on the power side of the sign.

If necessary, remove the ground lug from outside of the sign and re-attach it to the inside of the sign frame.

3.6 Tethers

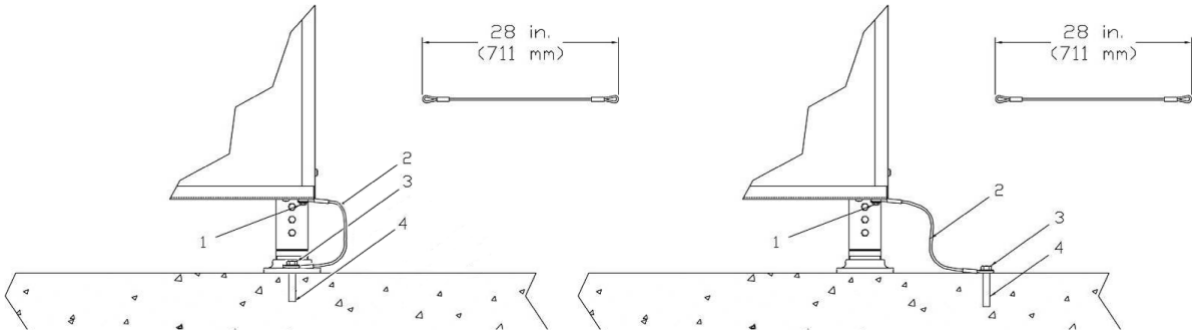
Sign tether anchor hard points must be provided on one sign mounting leg above the frangible breaking point. Tether anchor hard points must be provided so that one end of the tether attaches to the sign structure, and the other end attaches below the frangible point of the coupling.

When installing a sign, attach the tether to either one of the leg mounting bolts or an independent bolt in the sign concrete mounting pad. See Figure.

FAA AC 150/5345-44 specifies there must be a minimum of one tether for single-module signs, and a minimum of two tethers for multiple-module signs with continuous frame. For multiple-module signs, one tether is attached to both ends of the sign.

Tethers are factory installed and attached to the bottom of the sign. The location and quantity of tethers is determined when the order is placed.

Figure 11: Installing Tether



1. Sign frame anchor point, 5/16-18 x 3/4 in stainless-steel bolt.
2. Stainless-steel tether.
3. Tether attached to the anchor bolt
4. Anchor bolt

4.0 Maintenance and Repair

This section provides preventive maintenance and repair information for the AGSF-L LED Airfield Guidance Sign.

To keep the L-858 taxiway and runway signs operating efficiently, read this section and follow the preventive maintenance schedule. Refer to Table 9.

Table 9: Preventative Maintenance Schedule

Interval	Maintenance Task	Action
Daily	Check for good sign illumination	Inspect, troubleshoot, and replace components as necessary
Monthly	Check for dirty panels	Clean with mild soap and water to remove any dirt, dust, or debris
	Check for vegetation covering the panel	Remove vegetation
6 months	Check for loose wire connections	Secure or repair wire connections
	Check for cracked or deteriorated wires	Repair or replace damaged wires
	Verify the sign is level	Adjust the sign legs as necessary
	Inspect and clean the interior of the sign	Clean with mild soap and water to remove any dirt, dust, or debris
	Inspect and clean the channel in the sign frame where the legend panel rests	Clean with mild soap and water to remove any dirt, dust, or debris
	Inspect LED bars for damage or failed LEDs	Troubleshoot and replace LED bars as necessary
Annually	Check the sign frame for scratches, corrosion, or paint flaking off	Remove corrosion and touch-up-paint as needed
	Check for discolored or faded panels	Clean or replace panels as needed
	Check for deteriorated gaskets	Replace damaged gaskets as needed

CAUTION

This equipment may contain electrostatic sensitive 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 should 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 or, synthetic fiber clothing. They must be laid down on conductive surfaces.
- Electronic modules and components must be stored and transported in conductive packing.

4.1 Cleaning

The AGSF-L LED sign requires minimal maintenance. However, with the intrusion of dust, dirt, and water it is necessary to inspect and clean the interior of signs periodically to ensure proper light output and improve the life of the sign and its components.

Ensure the channel surrounding the sign frame where the legend panel rests is free of dirt, sand, and debris. Build-up in this channel may cause binding, preventing the panel's natural expansion and contraction, and necessary movement, causing the panel to bind and bow, or even the vinyl to de-laminate from the panel.

Insects, mice, and other rodents may choose to nest inside the sign. This can result in damage to wires and other components along with the presence of grass, trash and other bedding materials that can hinder light output and sign effectiveness. For these reasons, inspect and clean airfield guidance signs at least twice a year.

4.2 Faded Legend Panels

If sign panels are faded from sun exposure or damaged to the extent that the message is no longer readable, the sign panel must be replaced. Refer to Parts section of this user manual for replacement sign panels.

4.3 LED Replacement

LED replacement should be accomplished with the sign de-energized to prevent the possibility of electric shock. An on/off switch disconnects power from the power supply and LED bars, however it is always recommended that the airfield circuit be de-energized and locked-out prior to performing any maintenance. Refer to section Replacing a LED Light Bar for LED replacement instructions.

4.4 Current Check

In accordance with FAA AC 150/5345-44k, at least twice a year, the current through the sign circuit should be checked to verify that it is correct for the sign. If not correct for all steps, make current adjustments as needed.

4.5 Replacing the Power Supply

1. De-energize and lock-out the airfield circuit before performing any sign maintenance.
2. Remove the top cover and legend panel.
3. Carefully remove the power supply cover and disconnect all wires from the power supply. Retain the cover for re-assembly.
4. Loosen nuts securing the mounting plate to the sign pole. Remove the four #8-32 screws and lock washers securing the power supply to the mounting plate. Retain screws for re-assembly.
5. Verify the P1 shunt/jumper of the replacement power supply matches the old power supply and Figure 12. For all AGSF-L LED signs, the shunt/jumper should be in the standard position connecting 1 and 2 for 440mA output. Ensure the shunt/jumper is fully seated.
6. Apply thermal compound to the mounting surface of the replacement power supply to ensure good heat transfer to the frame. Do not apply too little or too much thermal compound.
7. Attach the replacement power supply to the mounting plate using the four #8-32 screws and lock washers. Make sure the power supply is seated flat against the plate. Realign and secure the mounting plate to the pole. Torque 5/16-18 nuts to 112 in-lb.

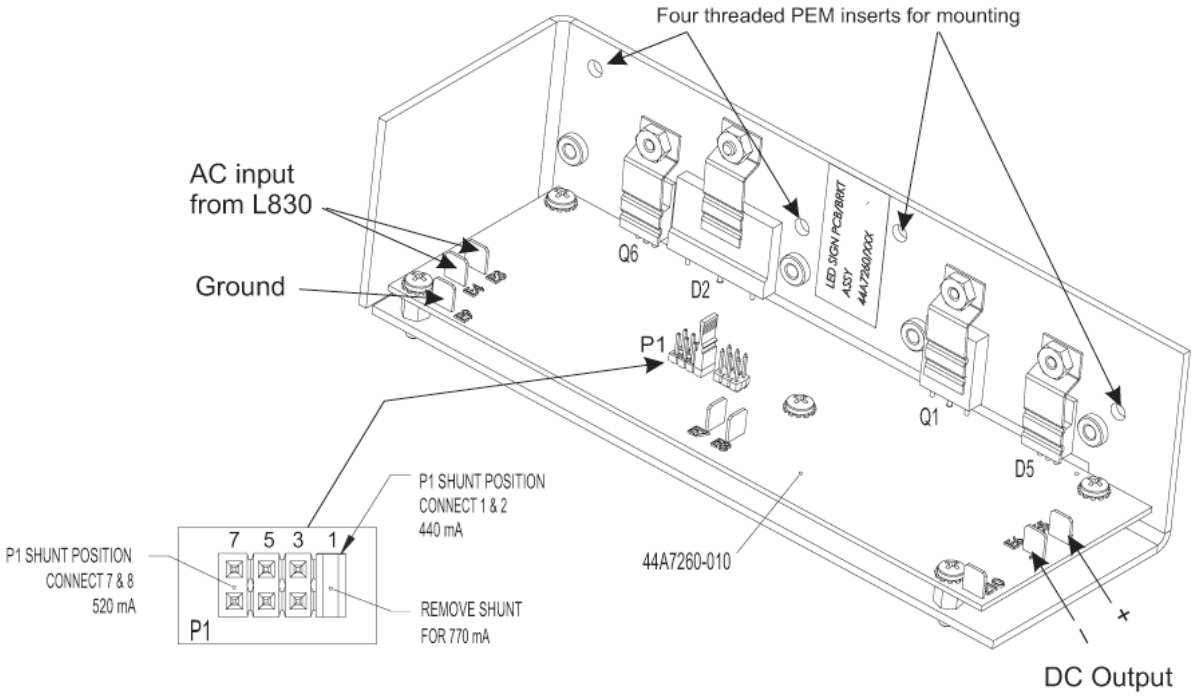
   CAUTION

   Be careful that the screws do not bind or cross-thread as you tighten them. This may give the impression that the power supply is firmly mounted when it is not.

8. Locate the two AC input power wires (white and white) from the sign switch or (white and black) from the L-823 cord set. Ensure the wires double-pass through the ferrite connector then single-pass through the rubber grommet. Attach the rubber grommet to the opening on the top of the power supply. Connect these wires to the Power Supply terminals E3 and E4 labeled "AC INPUT". This is the 6.6A input from the isolation transformer, polarity does not matter. Refer to wiring diagram for more information.
9. Locate the two DC output wires (blue and black) that connect the DC output from the power supply to the shorted LED PCB and LED bars. Connect these wires to the Power Supply terminals E5 and E6 labeled "OUTPUT". This is a regulated 440mA DC current and polarity does matter. Refer to wiring diagram for more information.
10. Locate the two DC output wires (white/red and white/black) exiting the shorted LED PCB. Connect the white/red wire to the Power Supply terminal E7 labeled "POWER", and the white/black wire to the power supply terminal E8 labeled "GROUND". Ensure the 4 wires (blue, black, white/red, and white/black) single-pass through the ferrite connector. Refer to wiring diagram for more information.
11. Verify that the sign wiring matches the Wiring Diagram, Figure 17 .

12. Re-install the power supply cover. You are now ready to apply power to the sign.
13. Re-install the legend panel and top cover. Torque top cover bolts to 50±5 lb/in (5.7±0.6 N•m).

Figure 12: LED Power Supply



4.6 Replacing a LED Light Bar

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.

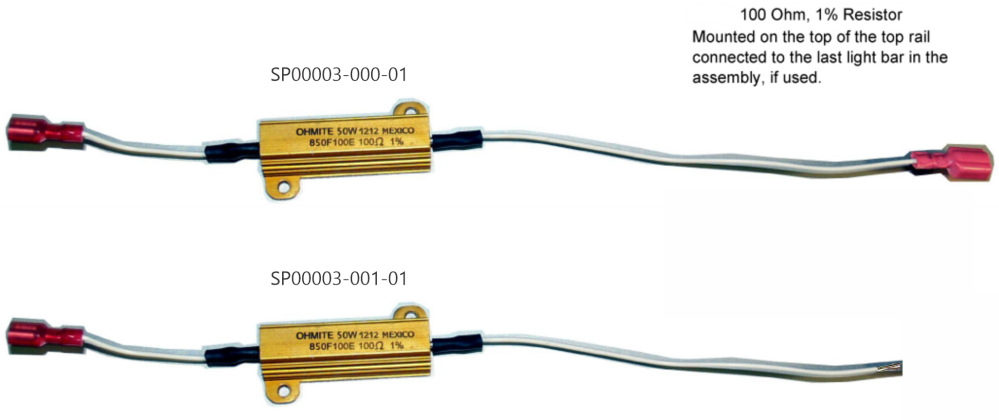
Figure 13: Three Sizes of Light Bars

1. De-energize and lock-out the airfield circuit before performing any sign maintenance.
2. Remove the top cover and legend panel.
3. Disconnect the damaged LED bar by separating the quick-slide terminals on both red and black wires on both ends of the LED bar.
4. Loosen but do not remove the small Phillips pan head screws securing the LED bar to the LED mounting bracket.

5. Remove the hex head screws securing the LED mounting bracket to the sign frame. Retain screws for re-assembly.
6. Note the orientation of the LED bar, remove the LED bar from the LED mounting brackets and replace the led bar.
7. Re-install the LED mounting brackets to the sign frame.
8. Center the LED bar within the module, tighten the Phillips pan head screws to secure the LED bar to the LED mounting bracket. Do not over-tighten the screws, this may damage the LED bar.
9. Re-connect the quick-slide terminals on both ends of the LED bar. Replace the panels, top cover and restore the power to the sign.
10. Check that all electrical connections are tight.
11. Restore power to the sign to confirm operation.
12. Re-install the front legend panel and top cover. Torque top cover bolts to 50±5 lb/in (5.7±0.6 N•m).

4.7 Replacing a Resistor Assembly

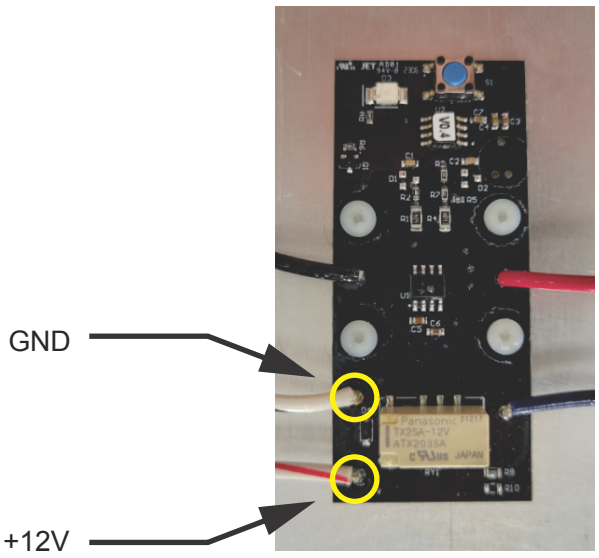
Figure 14: Resistor Assembly



1. De-energize and lock-out the airfield circuit before performing sign maintenance.
2. Remove the top cover and front legend panel.
3. Disconnect the damaged resistor by separating the connectors on both ends of the resistor.
4. Remove the small Phillips pan head screws securing the resistor to the mounting plate assembly.
5. Apply thermal compound to the mounting surface of the replacement resistor to ensure good heat transfer to the mounting plate. Do not apply too little or too much thermal compound.
6. Attach the resistor to the mounting plate assembly and secure with small Phillips pan head screws.
7. Re-connect the resistor by connecting the the connectors on both slides of the terminals.
8. Check that all electrical connections are tight.
9. Reinstall the front legend panel and top cover. Torque top cover bolts to 50±5 lb/in (5.7±0.6 N•m).

4.8 Replacing a Shorted LED PCB

Figure 15: Shorted LED PCB Test

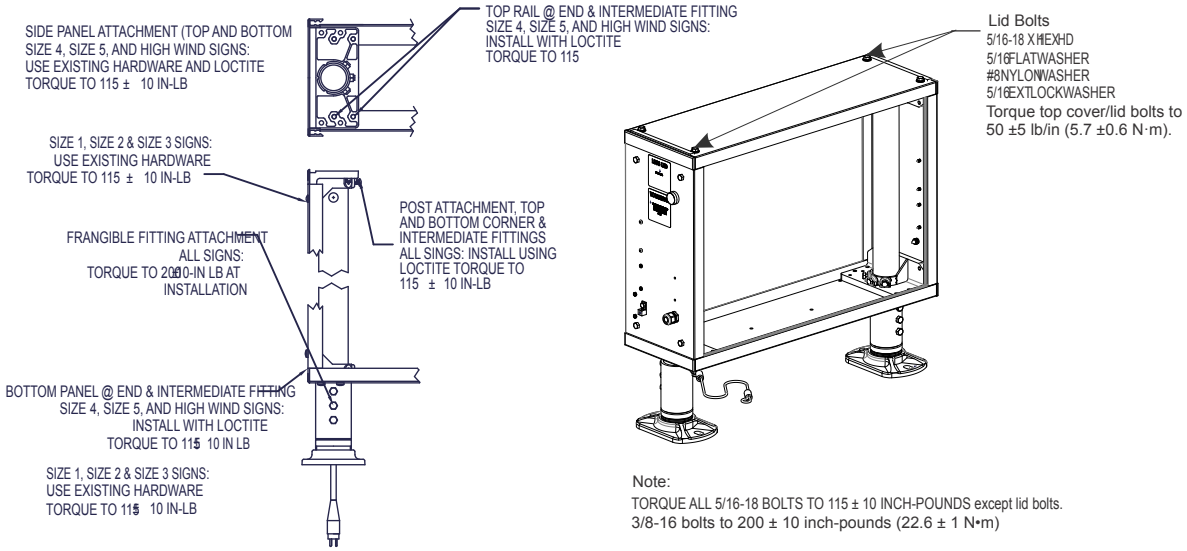


1. De-energize and lock-out the airfield circuit before performing sign maintenance.
2. Remove the top cover and front legend panel.
3. Disconnect the damaged shorted LED PCB by separating wires connecting the PCB to other electronics. Note wire locations to make new PCB installation easier.
4. Remove the power supply cover. Remove the shorted LED PCB from the cover.
5. Using the existing hardware, attach the new shorted LED PCB to the cover.
6. Connect shorted lead PCB wires to E7 and E8 of the power supply. Refer to Wiring Diagrams for wiring instructions. Reinstall the cover onto the power supply.
7. Reconnect remaining shorted LED PCB wires. Refer to Wiring Diagrams for wiring instructions.
8. Check that all electrical connections are tight.
9. Restore power to the sign.
10. A calibration process will begin automatically. The calibration process takes approximately 30-60 seconds to complete. The sign will then turn "OFF", signaling the calibration process is complete.
11. Cycle power to the sign "OFF" and back "ON" and confirm normal operation.
12. Reinstall the front legend panel and top cover. Torque top cover bolts to 50±5 lb/in (5.7±0.6 N•m).

4.9 Sign Bolt Torque Diagram

The sign assembly bolt torque value are depicted in the following diagram.

Figure 16: Bolt Torque Diagram



Note

TORQUE ALL:

5/16-18 bolts to 115 ± 10 inch-pounds, (13 ± 1 N•m) (except: Torque top cover lid bolts)

Torque top cover 5/16-18 lid bolts to 50 ±5 lb/in (5.7 ±0.6 N·m).

3/8-16 bolts to 200 ± 10 inch-pounds (22.6 ± 1 N•m)

5.0 Wiring Diagrams

Figure 17: Wiring Diagram for Signs Equipped with a Shorted LED Detection PCB (Page 1)

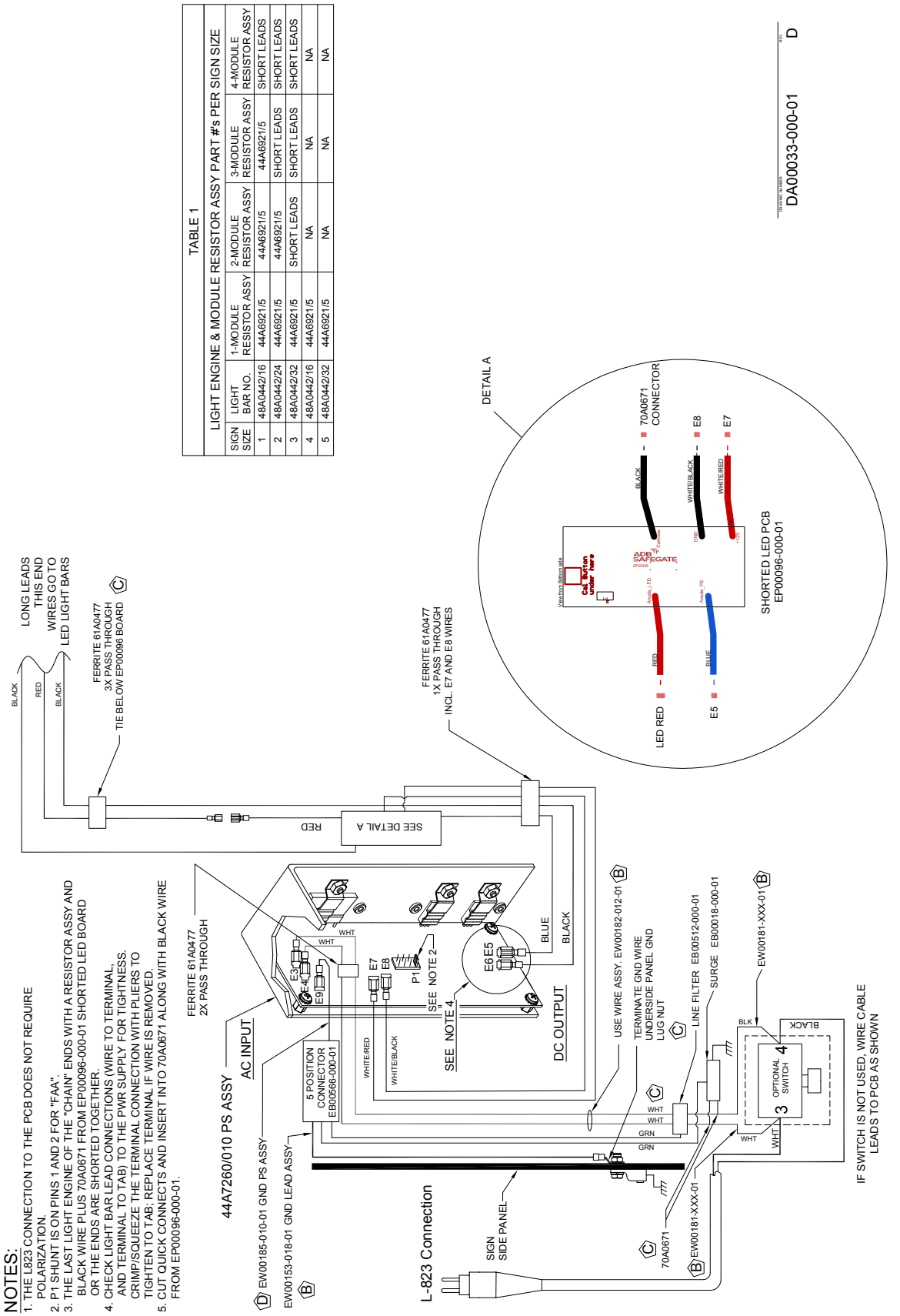


Figure 18: Wiring Diagram (page 2)

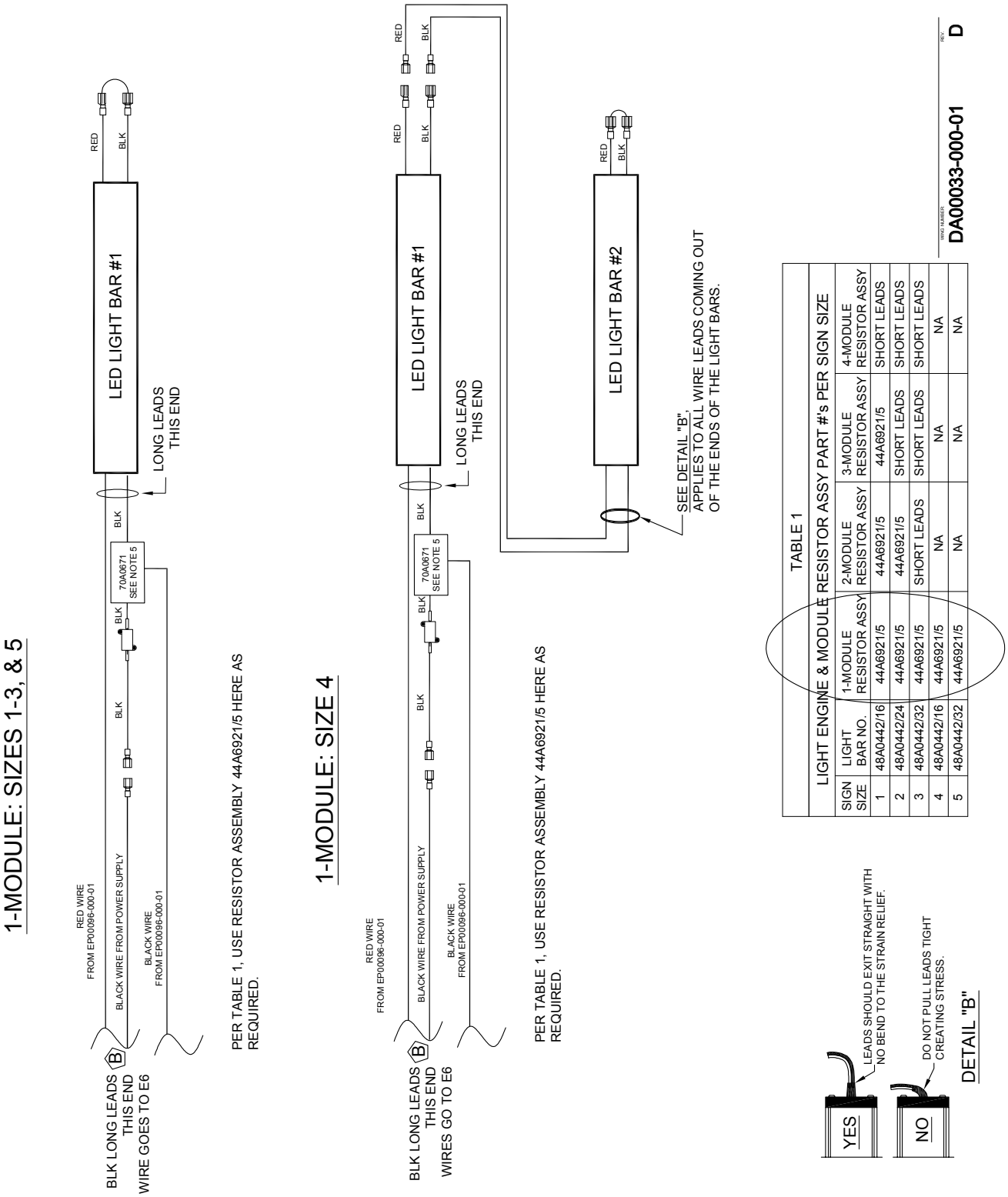


Figure 19: Wiring Diagram (page 3)

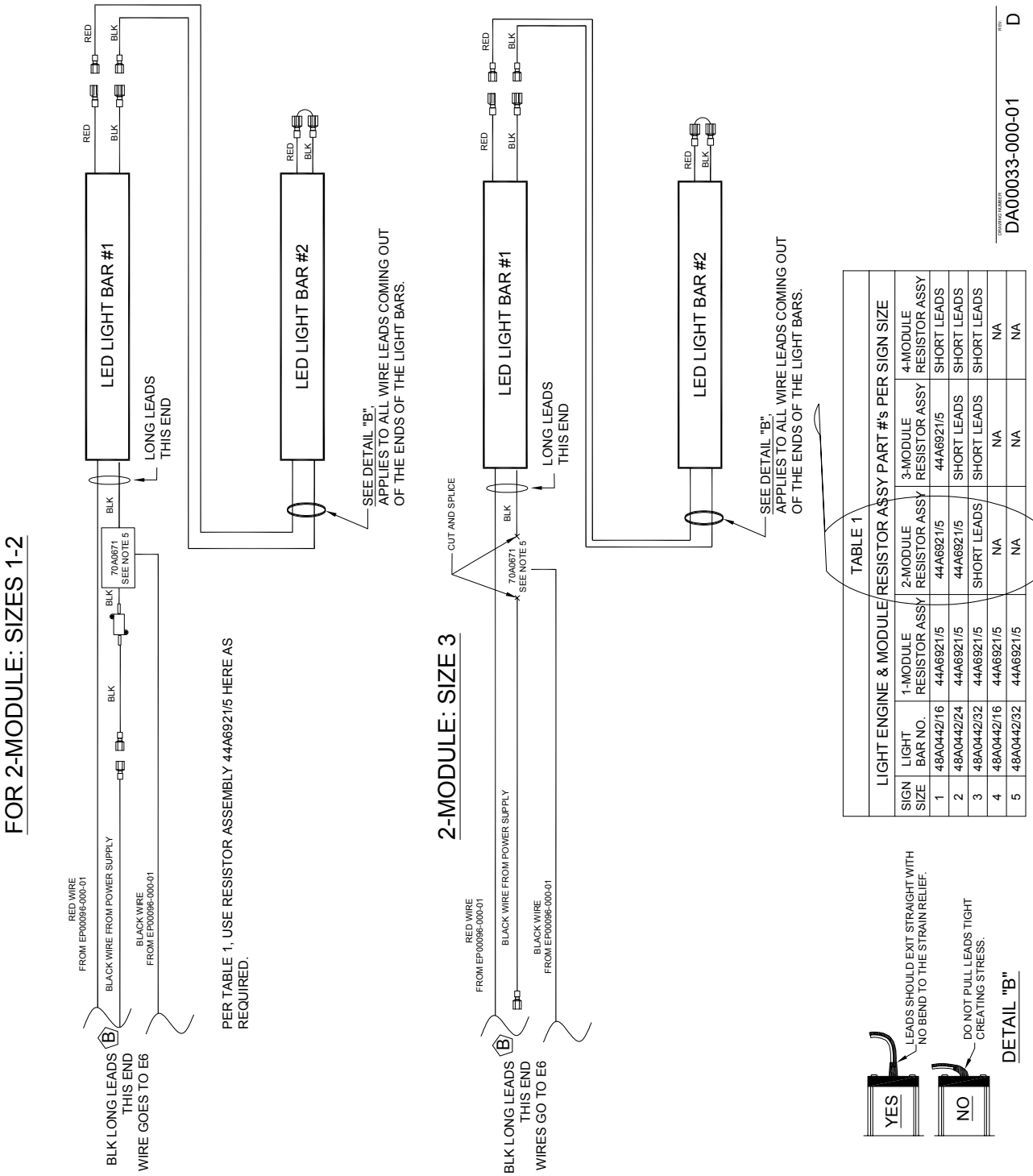


Figure 20: Wiring Diagram (page 4)

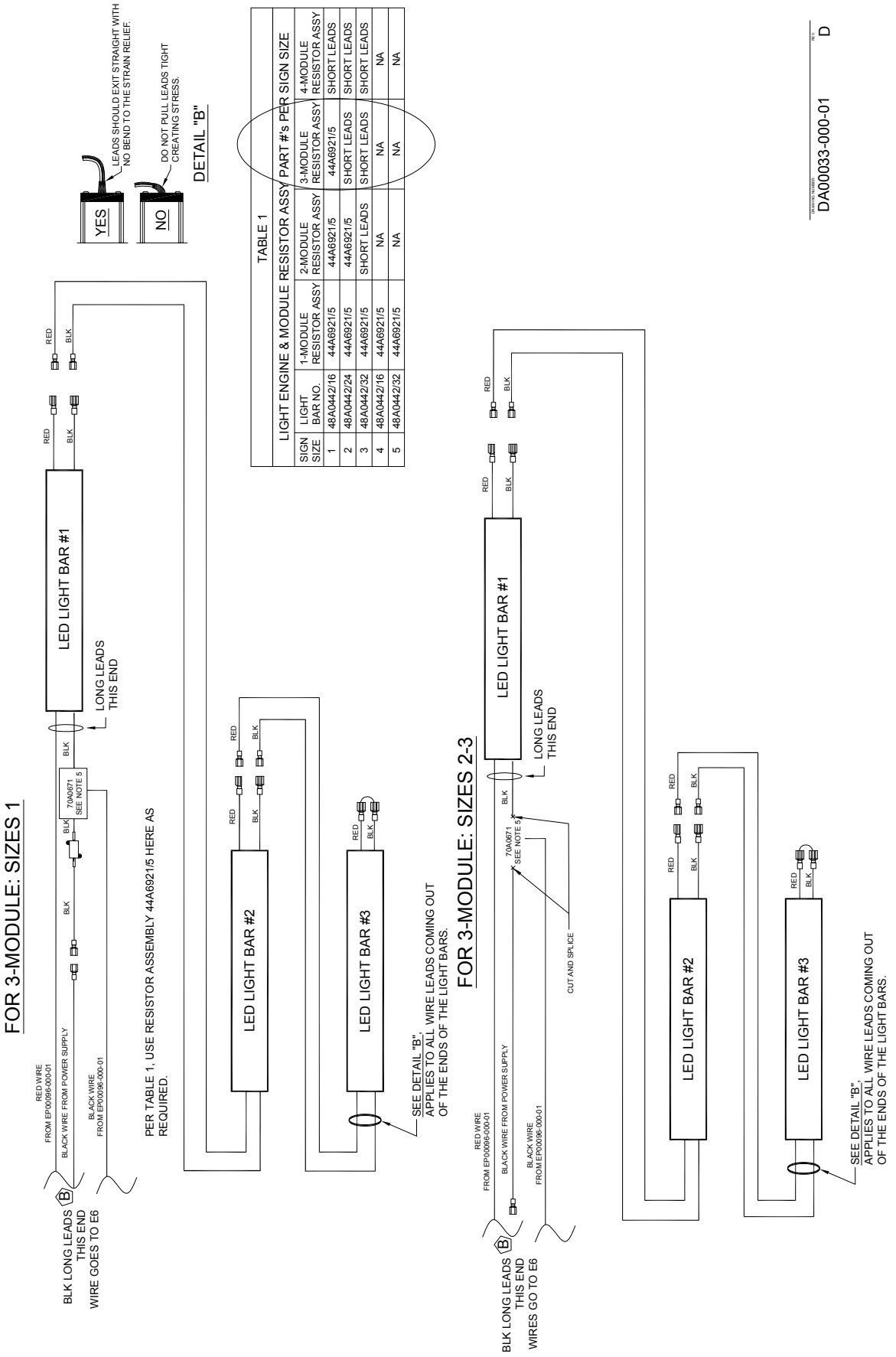


Figure 21: Wiring Diagram (page 5)

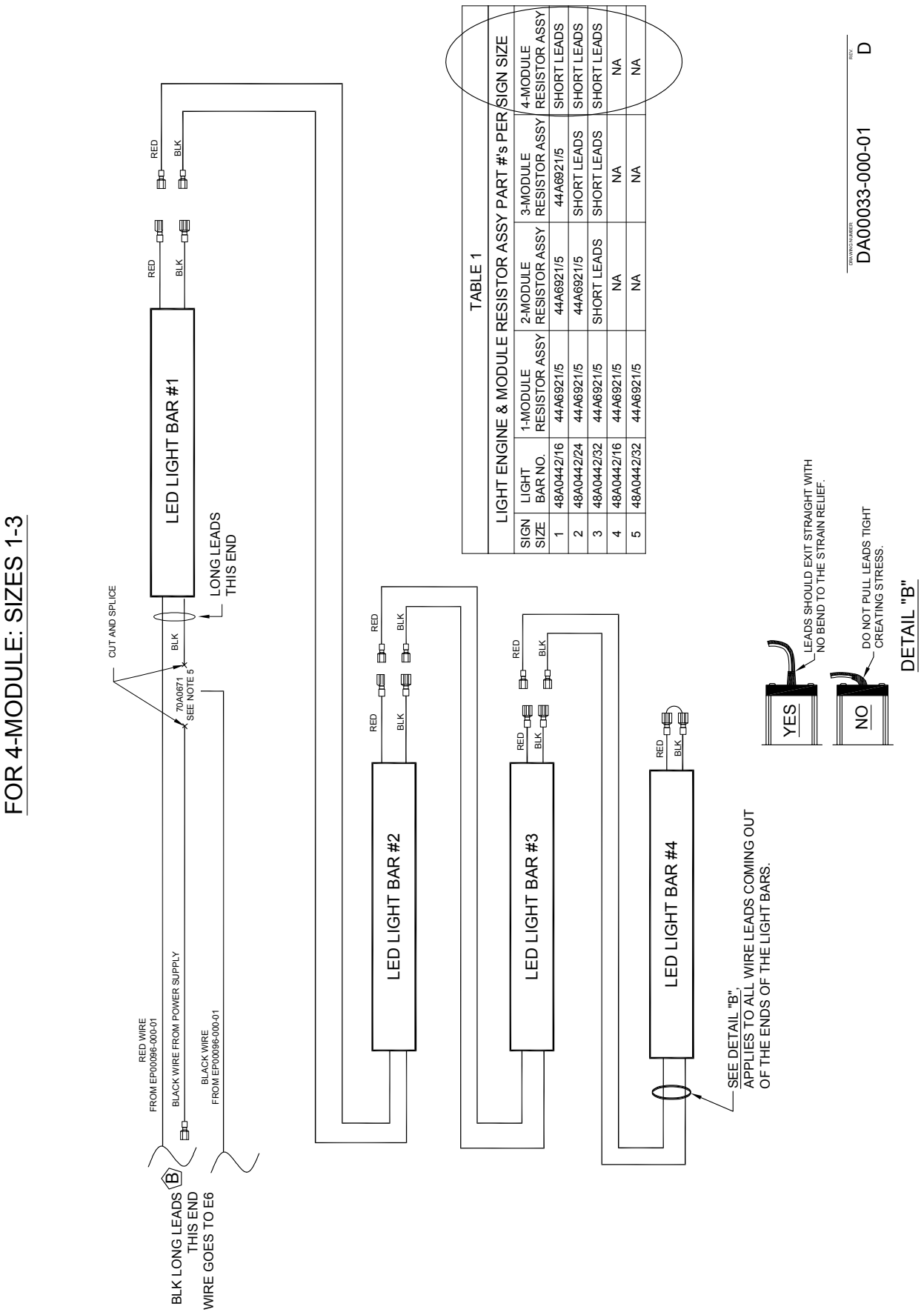


TABLE 1

LIGHT ENGINE & MODULE RESISTOR ASSY PART #'s PER SIGN SIZE					
SIGN SIZE	LIGHT BAR NO.	1-MODULE RESISTOR ASSY	2-MODULE RESISTOR ASSY	3-MODULE RESISTOR ASSY	4-MODULE RESISTOR ASSY
1	48A0442/16	44A6921/5	44A6921/5	44A6921/5	SHORT LEADS
2	48A0442/24	44A6921/5	44A6921/5	SHORT LEADS	SHORT LEADS
3	48A0442/32	44A6921/5	SHORT LEADS	SHORT LEADS	SHORT LEADS
4	48A0442/16	44A6921/5	NA	NA	NA
5	48A0442/32	44A6921/5	NA	NA	NA

6.0 Troubleshooting

This section provides troubleshooting information for the AGSF-L LED Airfield Guidance Sign. The information covers only the most common failure modes. If you cannot resolve the problem with the information given here, contact your local ADB Safegate representative for help.

Table 10: Standard LED Signs

Problem	Possible Cause	Corrective Action
All LEDs are OFF	Sign ON/OFF Switch is in the Closed/Shorted Position	Not all signs are equipped with a switch. If your sign does not have a switch, proceed to the next possible cause. With field current ON, ensure the switch is in the open position for current to pass through to the power supply. The Push-Button switch position (Out = Open for the sign to be ON). For the sign to be OFF, the Push-Button switch position is (IN = Closed/Shorted for the sign to be OFF).
	No Current or Incorrect Input Current	With field current ON, verify correct current is coming into the sign. Using a true RMS ammeter clamp, measure the current on the secondary and ensure proper current at all steps: ▪ 5-Step (2.8-6.6 A) ▪ 3-Step (4.8-6.6 A) ▪ 1-step (5.5 A) Check the L-830 transformer wattage rating: if it is too small, a higher wattage transformer is needed. Refer to section Sign Load & Transformer Requirements.
	Loose Wires or Connections	Check for loose wires and tighten or replace wires as necessary. All LED are connected in series to a power supply. If there are any loose or open connections, all the LED bars will be OFF.
	Faulty Surge Arrestor or EMI Filter	Check surge protector and EMI filter for signs of damage. Replace components as necessary.
	Faulty ON/OFF Switch	Not all signs are equipped with a switch. If your sign does not have a switch, proceed to the next possible cause. With field current ON, verify the Push-Button switch position (Out = Open for the sign to be ON). Using a true RMS ammeter clamp, verify expected series circuit current exists in the AC POWER input wires connected to E3 and E4 on the power supply, see Figure 12. If current does not exist, the switch is faulty, replace the switch.

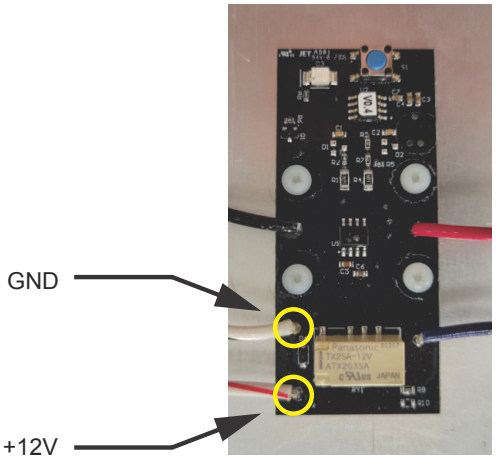
Table 10: Standard LED Signs

Problem	Possible Cause	Corrective Action
	Faulty Power Supply	Remove the power supply cover. For a normal operating sign and power supply, when power is first applied, the green LED D4 "heartbeat LED" on the power supply PCB will begin flashing and stabilize at a rate of 1 flash per second. If the power supply senses an open circuit, the LED D4 will turn OFF. With field current on, measure the DC voltage at E7 to E8, see Figure 12. The voltage should be 10-13 VDC on a properly operating power supply. The voltage should be 10-13 VDC on a properly operating power supply. If the proper voltage does not exist, replace the power supply. If the proper voltage does exist, proceed to the next step. Remove input power, disconnect the DC OUTPUT connections at E5 and E6 to LED bars. Restore input power, using a multi-meter connect probes at E5 to E8. Look for a rising voltage up to approximately 190 VDC within the first few seconds of powering on the sign. The voltage will then drop to approximately 50 VDC and then cycle five times between approximately 190 VDC to 50 VDC before it will stabilize at approximately 190 VDC. If proper voltage does not exist, replace the power supply. If the voltage is between 50-190 VDC during the first few seconds of applying power, the power supply is likely good. To reset the power supply, the input power to the power supply must be disconnected for about 1 minute to fully drain any stored power. Restore input power, the power supply will initiate startup procedure. Remove input power and reconnect the DC OUTPUT connections at E5 and E6.
	Faulty Resistor	Not all signs are equipped with a resistor, see Figure 14 to determine if your sign should be equipped with a resistor. Disconnect the resistor and using a multimeter, measure the resistance of the 100 Ohm resistor located along the top rail of the sign. The resistance should be approximately 100 Ohms. If the resistor if faulty, replace the resistor. Ensure the resistor is securely fastened to the top rail of the sign frame without any gaps between the mating surfaces. If replacing the resistor, ensure an adequate amount of heat conductive thermo-joint compound is applied to the mating surface to properly dissipate heat.

Problem	Possible Cause	Corrective Action
All LEDs are OFF	Faulty LED Bar	Disconnect the LED bars and using the LED tester 44A7264/1, test each LED bar. If the LED bar does not illuminate, replace the LED bar. If the LED bar illuminates, carefully observe each of the LEDs within the LED bar to ensure all LEDs are operating properly. Size 1 and 4 signs have 16" LED bars with 6 LEDs each. Size 2 signs have 24" LED bars with 9 LEDs each. Size 3 and 5 signs have 32" LED bars with 12 LEDs each. If any LEDs within the LED bar are not illuminated or appear dim, replace the LED bar. **CAUTION** Never connect a single LED light bar directly to the power supply. The power supply is designed to have a minimum load connected to it. Connecting only one LED light bar to a power supply will result in LED current being too high and damage the LED bar.
	Faulty Shorted LED Detection PCB	Verify all connections to shorted LED board and inspect for visible signs of damage. Using a multimeter measure DC voltage at +12V to GND on the shorted LED detection PCB (as shown in Figure 22), the voltage should be 10-13 VDC. If voltage does not exist, this means the supply voltage from the power supply is interrupted. Ensure good wire connections to the power supply and troubleshoot the power supply as needed. If the correct voltage does exist, disconnect input power and isolate the shorted LED detection PCB by connecting the red LED bar lead wire directly to E5 on the power supply. Restore input power, if the LEDs turn on and remain on for more than 30 seconds, the shorted LED detection PCB is faulty, replace the shorted LED detection PCB.

Problem	Possible Cause	Corrective Action
All LEDs Turn ON then OFF	Faulty Shorted LED PCB	If this sign has a replacement shorted LED Detection PCB, it is normal for a calibration process to take place during the first start-up of the sign. Cycle power OFF then ON to resume normal sign operation. If this does not resolve the problem, begin troubleshooting procedure for Faulty LED Bar. If all LED bars are operating properly, replace the shorted LED Detection PCB.
LEDs are Dim	No Current or Incorrect Input Current	Verify correct current is coming into the sign using a true RMS ammeter. Ensure proper current at all steps: ▪ 5-Step (2.8-6.6 A) ▪ 3-Step (4.8-6.6 A) ▪ 1-step (5.5 A) Check the L-830 transformer wattage rating, if it is too small, a higher wattage transformer is needed.
	Faulty or Incorrect Size Isolation Transformer	If LEDs are dim, ensure correct size isolation transformer is used with this sign. Using a multimeter, measure primary and secondary current and ensure they are within ±5%. Replace isolation transformer or increase isolation transformer size as necessary.

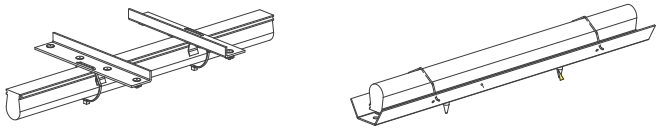
Figure 22: Shorted LED Detection PCB Troubleshooting



6.1 Troubleshooting LED Tube Signs

For signs equipped with LED tubes, spare parts support is no longer offered. Refer to Table 11 for information on ADB Safegate LED Tube Retrofit Kits.

Figure 23: Light Tube Assembly Diagrams



LED LIGHT ENGINE ASSEMBLY TOP LED LIGHT ENGINE BOTTOM ASSEMBLY

Table 11: LED Tube Retrofit Kits

Problem – LED Signs	Possible Cause	Corrective Action
All LEDs are out or not functioning correctly	One or more Light Tubes have failed	If the sign utilizes light tubes as shown above, please see ALN166 for replacement of the light tubes while keeping the power supply. You will require kit: 94A0683-XXX LED Sign Upgrade Kit. To order the kit, you will need the sign size and the number of modules. Please review the KIT Service Bulletin ALN166 found in the ADB SAFEGATE Product Center.
All LEDs are out	Power Supply has failed	If the sign utilizes light tubes as shown above, please see ALN158 for replacement of the light tubes and replacing the power supply. You will require kit: 94A0628-XXX LED Sign Upgrade Kit. To order the kit, you will need the sign size and the number of modules. Please review the KIT Service Bulletin ALN158 found in the ADB SAFEGATE Product Center.

7.0 Parts
7.1 AGSF-L Ordering Codes

Ordering Code

Type, Size, Modules, Style, Face, Total Number of Panels, Fixed Digit, Power, Tether

S □□□- □□□□□□1

Type
R = Standard (Mode 2)
S = High-Wind (Mode 3)

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

Modules
1 = 1 Module
2 = 2 Modules
3 = 3 Modules
4 = 4 Modules

Style
7 = Style 2, Style 3, Style 5
A = APS

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.

Fixed Digit
3 = 3

Power
1 = Power through leg without ON/OFF switch
2 = Power through leg with ON/OFF switch
3 = Power through side without ON/OFF switch[1]
4 = Power through side with ON/OFF switch[1]
5 = Customer-provided entry without ON/OFF switch[12]
6 = Customer-provided entry with ON/OFF switch[12]
9 = Power through bottom without ON/OFF switch[1]
A = Power through bottom with ON/OFF switch[1]

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

[1] Not ETL certified.

Note
Customer to provide legend information and power connection side. It is important to match power cord exit location with legend side.

Legend Panel Replacement

Size, Modules, Panel Type, Sign Type

44A6084/ □□□□

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

Modules
1 = 1 Module
2 = 2 Modules

Panel Type
1 = With legend (retroreflective)
2 = Black

Sign Type
0 = Mode 2 and Mode 3

Legend Panel Divider

Size, Paint Coverage, Paint Color

44A6173/ □□□

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

Paint Coverage
A = Solid black[3]
C = Clear front (paint back side only)

Paint Color
R = Red
Y = Yellow
B = Black[3]

LED Retrofit Kit

	Size	Modules	
94A0628/	☐	☐	**0**

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

Modules
1 = 1 Module
2 = 2 Modules
3 = 3 Modules
4 = 4 Modules

Note
Retrofit kits for ADB Safegate AGSF-H tungsten-halogen and AGSF-F fluorescent signs only.

LED Light Engine Tester

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.

LED Light Engine Tester Ordering Code

LED Light Engine Tester	44A7264/1

7.2 AGSF-L Parts

Table 12: Spare Parts

Part Number	Description
62A2142	Floor flange (2-bolt)
62A2146	Floor flange, high wind speed (4-bolt)
60A2678/10	Frangible coupling, size 1
60A2678/20	Frangible coupling, size 2
60A2678/30	Frangible coupling, size 3 or 5
60A2678/40	Frangible coupling, size 4
94A0054	Tether Assembly
73A0107/72	Cord Set 72" 16/2 Style 1 FAA
48A0442/16	LED light engine (bar), Size 1 and 4
48A0442/24	LED light engine (bar), Size 2
48A0442/32	LED light engine (bar), Size 3 and 5

[2]Cord set coiled up inside the sign. Customer provides entry.

[3]For paint coverage (Solid black), paint color (Black) must be selected.

Table 12: Spare Parts

Part Number	Description
SP00003-000-01	Resistor assembly, 100 Ohm (for sign part codes that end in 0)
SP00003-001-01	Resistor assembly, 100 Ohm (for sign part codes that end in 1)
SP00004-000-01	LED sign power supply (without cover)
EB00018-000-01	Surge protection device
EB00512-000-01	EMI filter
EP00096-000-01	Shorted LED detection PCB

Note
Size 4, 1 Module signs require (qty 2) LED light engines (bars) per sign.

Figure 24: Three Sizes of Light Bars (48A0442/16, 48A0442/24, 48A0442/32)

Figure 25: Resistor Assembly (SP00003-XXX-01)

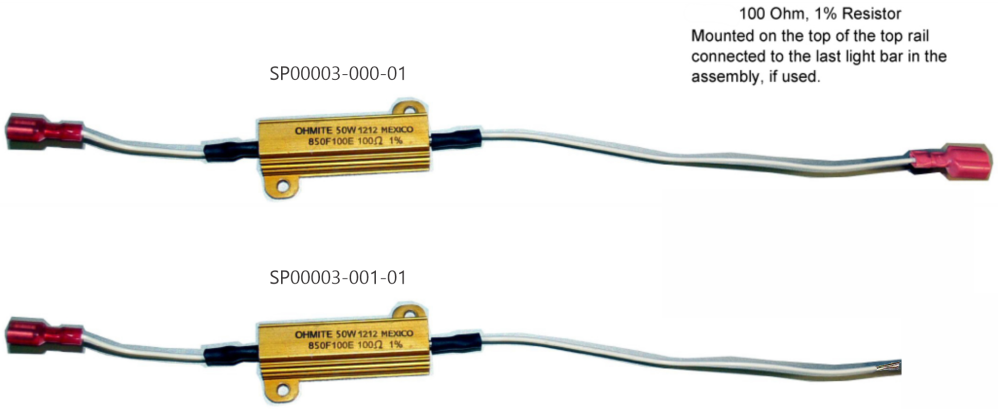


Figure 26: Sign Power Supply, without Cover (SP00004-000-01)

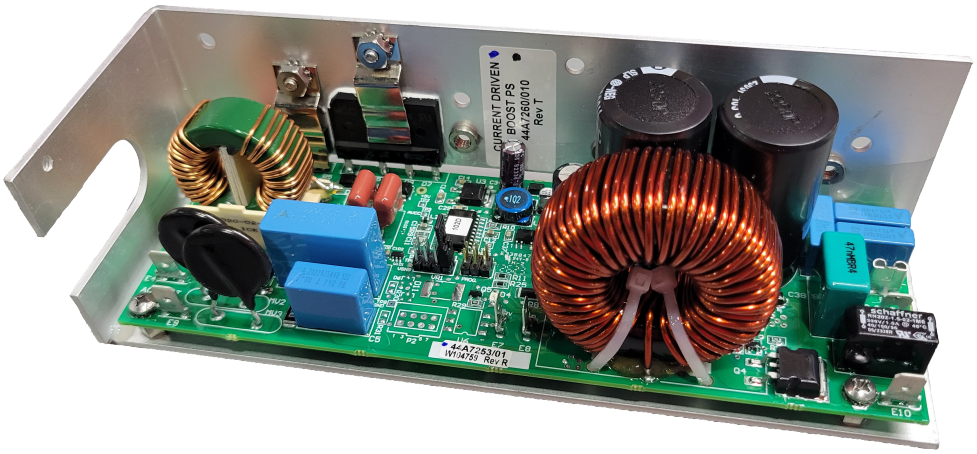


Figure 27: Shorted LED Detection PCB (EP00096-000-01)

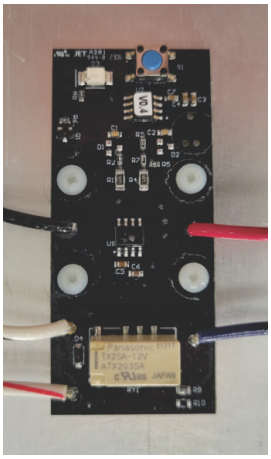


Figure 28: Sign Frame and Assembly

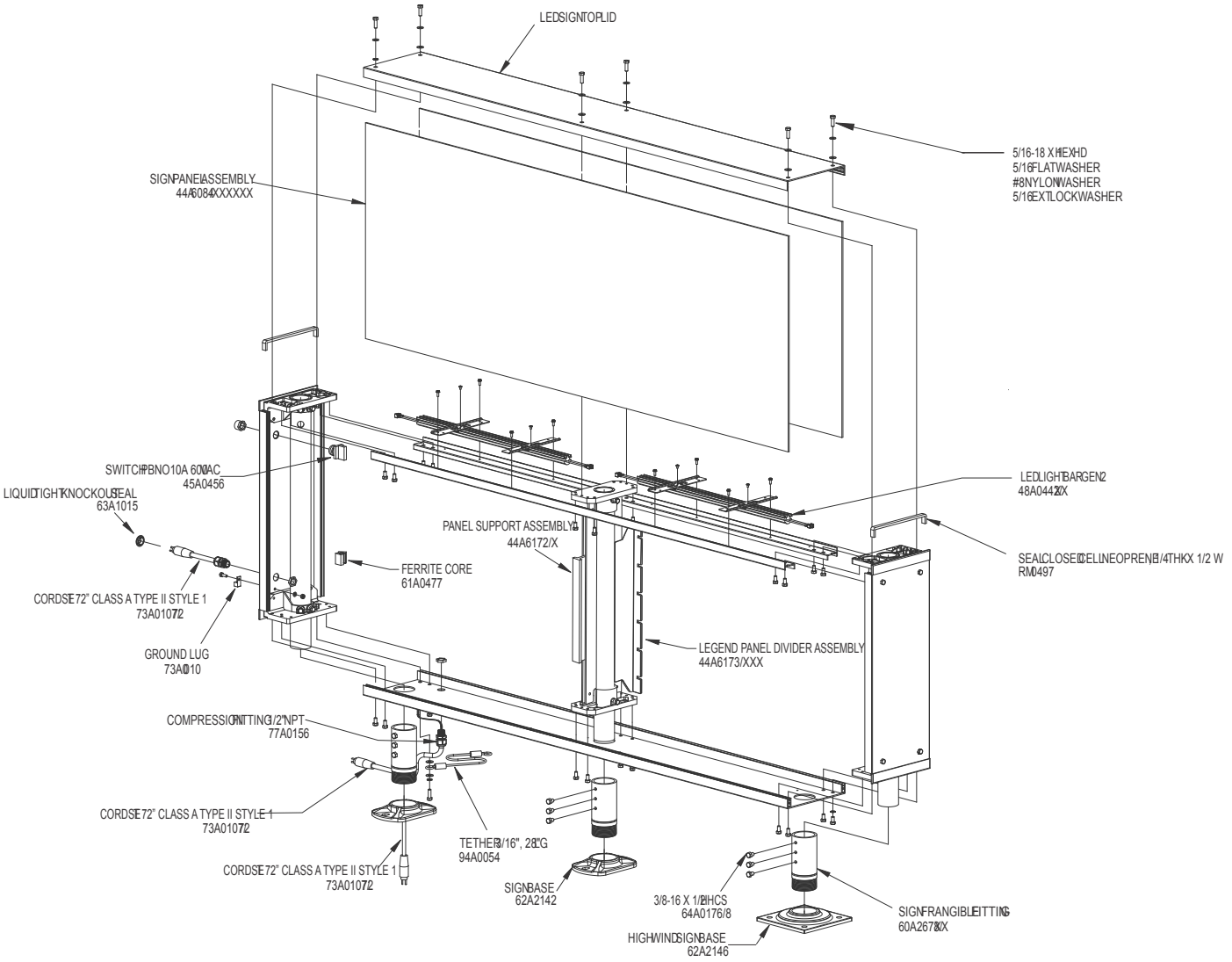
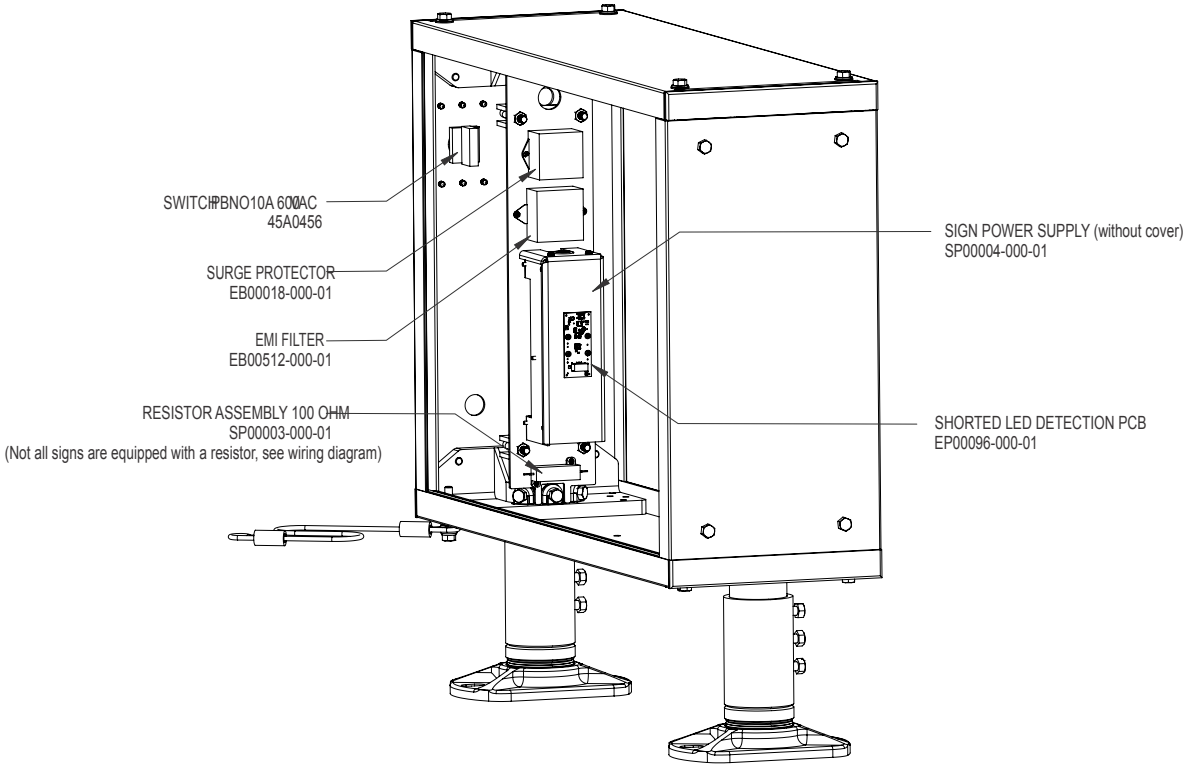


Figure 29: Power Supply and Electronics



Appendix A: SUPPORT

Our experienced engineers are available for support and service at all times, 24 hour/7 days a week. They are part of a dynamic organization making sure the entire ADB SAFEGATE is committed to minimal disturbance for airport operations.

ADB SAFEGATE Support

Technical Support – Global

Customers in Europe, the Middle East, Africa or Asia Pacific are more than welcome to our portal for technical support. Trained in all areas of system issues, troubleshooting, quality control and technical assistance, our highly experienced Technical support specialists are available 24 hours a day, seven days a week to provide assistance over the phone. In the Americas, we also offer live technical support.

Live Technical Support – Americas

If at any time you have a question or concern about your product, contact ADB SAFEGATE's US-based technical support specialists, available 24 hours a day, seven days a week, to assist you via phone.

ADB SAFEGATE Americas Technical Service & Support (US & Canada) :**+1-800-545-4157**

ADB SAFEGATE Americas Technical Service & Support (Canada): **+1-905-631-1597**

ADB SAFEGATE Americas Technical Service & Support (International): **+1-614-861-1304**

We can also be reached via email during regular business hours:

Airfield and Gate: **techservice.us@adbsafegate.com**

Gate: **gateservice.us@adbsafegate.com**

We look forward to working with you!

Before You Call

When you have an airfield lighting or system control system problem, prior to calling, please ensure the following:

- Review the product's manual and troubleshooting guide.
- Be located with the product ready to troubleshoot.
- Have all necessary information available: airport code/company name, customer id number, contact phone number/email address, product/part number.
- Have a True RMS meter available and any other necessary tools.

When calling about an issue with Safedock A-VDGS, we can serve you better if you collect the following information before you call:

- Relevant information regarding the issue you are calling about, such as gate number, flight number, aircraft type and time of the event.
- What, if any, actions have been taken to resolve the issue prior to the call.
- If available, provide a CCTV recording of the incident to aid in aligning the information from the Safedock log file.

Note

For more information, see www.adbsafegate.com, contact ADB SAFEGATE Support via email at support@adbsafegate.com or

Europe: +32 2 722 17 11

Americas: +1 614 861 1304. Press 3 for technical service or press 4 for sales support.

China: +86 (10) 8476 0106

Middle East and Africa: +971 4 452 7575

A.1 ADB SAFEGATE Website

The ADB SAFEGATE website, www.adbsafegate.com, offers information regarding our airport solutions, products, company, news, links, downloads, references, contacts and more.

A.2 Recycling

A.2.1 Local Authority Recycling

The disposal of ADB SAFEGATE products is to be made at an applicable collection point for the recycling of electrical and electronic equipment. The correct disposal of equipment prevents any potential negative consequences for the environment and human health, which could otherwise be caused by inappropriate waste handling. The recycling of materials helps to conserve natural resources. For more detailed information about recycling of products, contact your local authority city office.

A.2.2 ADB SAFEGATE Recycling

ADB SAFEGATE is fully committed to environmentally-conscious manufacturing with strict monitoring of our own processes as well as supplier components and sub-contractor operations. ADB SAFEGATE offers a recycling program for our products to all customers worldwide, whether or not the products were sold within the European Union (EU).

ADB SAFEGATE products and/or specific electrical and electronic component parts which are fully removed/separated from any customer equipment and returned will be accepted for our recycling program.

All items returned must be clearly labeled as follows:

- For Restriction of Hazardous Substances (RoHS)/Waste Electrical and Electronic Equipment (WEEE) Recycling
- Sender contact information (Name, Business Address, Phone number).
- Main Unit Serial Number.

ADB SAFEGATE will continue to monitor and update according for any future requirements for EU directives as and when EU member states implement new regulations and or amendments. It is our aim to maintain our compliance plan and assist our customers.

Empowering the Airside Evolution

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