



AGSB-L LED Airfield Guidance Sign
ICAO/TP 312

User Manual

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**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 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.

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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.

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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.

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**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 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.
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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 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 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. 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

1.1.7 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

These signs are designed to guide pilots to a particular point on the field, identify holding positions, identify taxiway and runway intersections, and prohibit aircraft entry into designated areas.



TP 312 LED Sign

ICAO LED Sign

2.1 LED Light Bar Airfield Guidance Sign

Compliance with Standards

ICAO:	Annex 14, Volume I, para 5.4 and Appendix 4
T/C:	Transport Canada TP 312

Uses

On Civil Airfields:

- Mandatory instruction signs
- Information signs
- VOR check-point sign

On Military Airbases:

- Mandatory instruction signs
- Information signs
- VOR check-point sign
- Runway distance-to-go signs
- Arrestor barrier signs

Mandatory signs - are used to identify a location beyond which an authorization from the tower is required to proceed. They include road-, taxi- and Cat I, II and III holding position signs, runway designation signs and "NO ENTRY" signs. They have white legends on red background.

Information signs - are all the other signs (except runway distance signs) providing information on routing (direction or destination) and on location. Information signs have black lettering on yellow background, except location signs. Location signs have a yellow legend on a black background. The message on stand-alone location signs is surrounded by a yellow border.

Operating Conditions

The taxiway and runway signs are designed for continuous outdoor use under the conditions presented below for operating temperature range, humidity, and wind.

Temperature:	-55 °F to +131 °F (-55 °C to +55 °C)
Humidity:	0 to 100%
Wind:	ADB Safegate standard signs withstand a wind loading of 320 km/h (200 mph) and break before the wind loading reaches 480 km/h (300 mph).

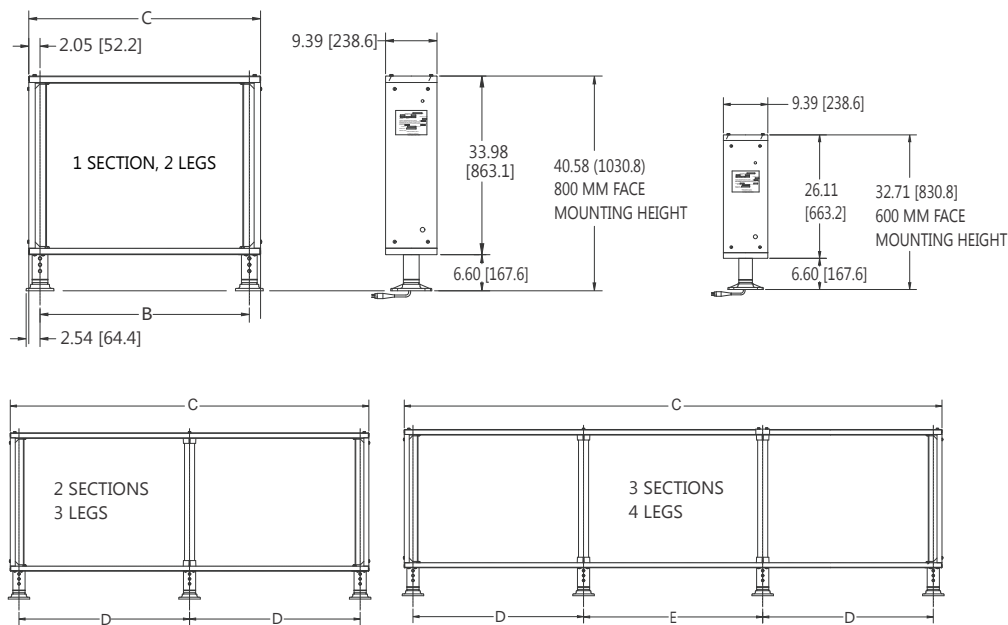
Electrical Supply

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

Construction

Corrosion-resistant sign construction requires minimal maintenance. The sign uses aluminum housing, acrylic sign legend panels, stainless steel hardware, and translucent sheeting.

Sign Dimensions - 600 mm and 800 mm Height (mm/in) - Standard mounting height shown.



Sign Type	Illuminated Face Length	B	C	D	E
1 Section, 2 Legs					
SBXA	700 mm	655.3 (25.90)	759.7 (29.92)	NA	NA
SBXB	900 mm	855.5 (33.68)	959.9 (37.79)	NA	NA
SBXC	1100 mm	1055.4 (41.55)	1159.8 (45.66)	NA	NA
SBXD	1300 mm	1255.3 (49.42)	1359.7 (53.53)	NA	NA
SBXE	1500 mm	1455.4 (57.30)	1559.8 (61.41)	NA	NA
2 Section, 3 Legs					
SBXF	1700 mm	NA	1759.7 (69.28)	827.7 (32.59)	NA
SBXG	1900 mm	NA	1959.7 (77.16)	927.7 (36.53)	NA
SBXH	2100 mm	NA	2159.7 (85.03)	1027.7 (40.26)	NA
SBXJ	2300 mm	NA	2359.7 (92.90)	1127.7 (44.40)	NA
SBXK	2500 mm	NA	2559.7 (100.78)	1227.7 (48.34)	NA
SBXL	2700 mm	NA	2759.7 (108.65)	1327.7 (52.27)	NA
SBXM	2900 mm	NA	2959.7 (116.53)	1427.7 (56.21)	NA

Sign Type	Illuminated Face Length	B	C	D	E
3 Section, 4 Legs					
SBXN	3300 mm	NA	3359.7 (132.27)	1077.7 (42.43)	1100.0 (43.31)
SBXP	3700 mm	NA	3636.5 (143.17)	1277.7 (50.30)	1100.0 (43.31)

Sign Load & Transformer Requirements

In the table below, the number for the total VA load imposed on the CCR represents the actual load imposed on the regulator and accounts for power factor and load imposed by the transformer. For signs that require two transformers a wye connector 94A0173 (ordered separately) is required to connect the transformers in series. Load data are estimates for worst case scenario.

600 mm and 800 mm Sign				
Sign Type	Sign Length (mm)	Transformer	Power Factor	Volt Amp VA Load
3-Step LED Signs (4.8 - 6.6 A)				
SBXA	700	300 W	0.87	150
SBXB	900	300 W	0.86	168
SBXC	1100	300 W	0.87	118
SBXD	1300	300 W	0.88	132
SBXE	1500	300 W	0.84	150
SBXF	1700	300 W	0.84	150
SBXG	1900	300 W	0.84	150
SBXH	2100	300 W	0.87	180
SBXJ	2300	300 W	0.87	180
SBXK	2500	500 W	0.88	241
SBXL	2700	500 W	0.88	241
SBXM	2900	(2) 300 W	0.88	295
SBXN	3300	(2) 300 W	0.88	295
SBXP	3700	(2) 300 W	0.88	289

600 mm and 800 mm Sign				
Sign Type	Sign Length (mm)	Transformer	Power Factor	Volt Amp VA Load
5-Step LED Signs (2.8 - 6.6 A)				
SBXA	700	300 W	0.85	151
SBXB	900	300 W	0.84	168
SBXC	1100	300 W	0.83	119
SBXD	1300	300 W	0.84	134
SBXE	1500	300 W	0.84	148
SBXF	1700	300 W	0.84	148
SBXG	1900	300 W	0.84	148
SBXH	2100	500 W	0.84	184
SBXJ	2300	500 W	0.84	184
SBXK	2500	(2) 300 W	0.84	261

600 mm and 800 mm Sign				
Sign Type	Sign Length (mm)	Transformer	Power Factor	Volt Amp VA Load
SBXL	2700	(2) 300 W	0.84	261
SBXM	2900	(2) 300 W	0.84	291
SBXN	3300	(2) 300 W	0.84	291
SBXP	3700	(2) 500 W	0.84	299
600 mm and 800 mm Sign				
Sign Type	Sign Length (mm)	Transformer	Power Factor	Volt Amp VA Load
Single-Step LED Signs (5.5 A)				
SBXA	700	200 W	0.89	124
SBXB	900	300 W	0.87	135
SBXC	1100	300 W	0.82	103
SBXD	1300	300 W	0.88	121
SBXE	1500	300 W	0.87	135
SBXF	1700	300 W	0.87	135
SBXG	1900	300 W	0.87	135
SBXH	2100	300 W	0.88	168
SBXJ	2300	300 W	0.88	168
SBXK	2500	300 W	0.89	220
SBXL	2700	300 W	0.89	220
SBXM	2900	500 W	0.89	255
SBXN	3300	500 W	0.89	255
SBXP	3700	500 W	0.89	252

Packaging Data (600 mm Signs)

Signs are shipped with L-823 cord set(s), frangible couplings, and mounting flanges - ready for installation.

Sign Type	Gross Assembled Weight								Carton Dimensions (h × w × d)	
	SB6X Standard Height		SBDX 1219 mm (48")		SBEX ¹ 1524 mm (60")		SBFX ¹ 1829 mm (72")			
	(lb)	(kg)	(lb)	(kg)	(lb)	(kg)	(lb)	(kg)	(in)	(mm)
SBXA	64	29.0	69	31.3	75	34.0	79	35.8	36 × 37 × 13	914 × 950 × 330
SBXB	72	32.6	77	34.9	83	37.6	87	39.5	36 × 45 × 13	914 × 1150 × 330
SBXC	80	36.3	85	38.5	91	41.3	95	43.1	36 × 53 × 13	914 × 1350 × 330
SBXD	88	39.9	93	42.2	99	44.9	103	46.7	36 × 61 × 13	914 × 1550 × 330
SBXE	97	44.0	102	46.3	108	49.0	112	50.8	36 × 70 × 13	914 × 1750 × 330
SBXF	122	55.3	130	59.0	138	62.6	145	65.8	36 × 77 × 13	914 × 1950 × 330
SBXG	130	59.0	138	62.6	146	66.2	153	69.4	36 × 85 × 13	914 × 2150 × 330
SBXH	138	62.6	146	66.2	154	69.8	161	73.0	36 × 93 × 13	914 × 2350 × 330
SBXJ	146	66.2	154	68.9	162	73.5	169	76.6	36 × 100 × 13	914 × 2550 × 330
SBXK	153	69.4	161	73.0	169	76.6	176	79.8	36 × 108 × 13	914 × 2750 × 330

SBXL	161	73.0	169	76.6	177	80.3	184	83.5	36 × 116 × 13	914 × 2950 × 330
SBXM	169	76.6	177	80.3	185	83.9	192	87.1	36 × 124 × 13	914 × 3150 × 330
SBXN	203	92.1	213	96.6	225	102.0	233	101.1	36 × 140 × 13	914 × 3550 × 330
SBXP	220	99.8	230	104.3	242	109.8	250	113.4	36 × 156 × 13	914 × 3950 × 330

Notes

- 1219 mm (48 in) signs ship as 1295 mm (51 in) height.
- 1524 mm (60 in) and 1829 mm (72 in) signs ship as standard height.

¹ Shipped same carton size as standard height; legs enclosed separately; requires assembly.

Packaging Data (800 mm Signs)

Signs are shipped with L-823 cord set(s), frangible couplings, and mounting flanges - ready for installation.

Sign Type	Gross Assembled Weight								Carton Dimensions (h × w × d)	
	SB8X Standard Height		SBGX 1219 mm (48")		SBHX ¹ 1524 mm (60")		SBJX ¹ 1829 mm (72")			
	(lb)	(kg)	(lb)	(kg)	(lb)	(kg)	(lb)	(kg)	(in)	(mm)
SBXA	72	32.6	77	34.9	83	37.6	87	39.5	43.5 X 37 X 13	1105 X 960 X 330
SBXB	82	37.0	87	39.5	93	42.2	97	44.0	43.5 X 45 X 13	1105 X 1150 X 330
SBXC	94	42.6	99	44.9	105	47.6	109	49.4	43.5 X 53 X 13	1105 X 1350 X 330
SBXD	104	47.0	109	49.4	115	52.2	119	54	43.5 X 61 X 13	1105 X 1550 X 330
SBXE	114	51.7	119	54.0	125	56.7	129	58.5	43.5 X 70 X 13	1105 X 1750 X 330
SBXF	136	61.7	144	65.3	152	68.9	159	72.1	43.5 X 77 X 13	1105 X 1950 X 330
SBXG	149	67.6	157	71.2	165	74.8	172	78.0	43.5 X 85 X 13	1105 X 2150 X 330
SBXH	161	73.0	169	76.7	177	80.3	184	83.5	43.5 X 93 X 13	1105 X 2350 X 330
SBXJ	173	78.5	181	82.1	189	85.7	196	88.9	43.5 X 100 X 13	1105 X 2550 X 330
SBXK	182	82.5	190	86.2	198	89.8	205	93.0	43.5 X 108 X 13	1105 X 2750 X 330
SBXL	193	87.5	201	91.2	209	94.8	216	98.0	43.5 X 116 X 13	1105 X 2950 X 330
SBXM	205	93.0	213	96.6	221	100.2	228	103.4	43.5 X 124 X 13	1105 X 3150 X 330
SBXN	242	110.0	252	114.3	264	119.7	272	123.4	43.5 X 140 X 13	1105 X 3550 X 330
SBXP	265	120.2	275	124.7	287	130.2	294	133.4	43.5 X 156 X 13	1105 X 3950 X 330

Notes

- 1219 mm (48 in) signs ship as 1295 mm (51 in) height.
- 1524 mm (60 in) and 1829 mm (72 in) signs ship as standard height.

¹ Shipped same carton size as standard height; legs enclosed separately; requires assembly.

3.0 Installation



WARNING

Read installation instructions in their entirety before starting installation.

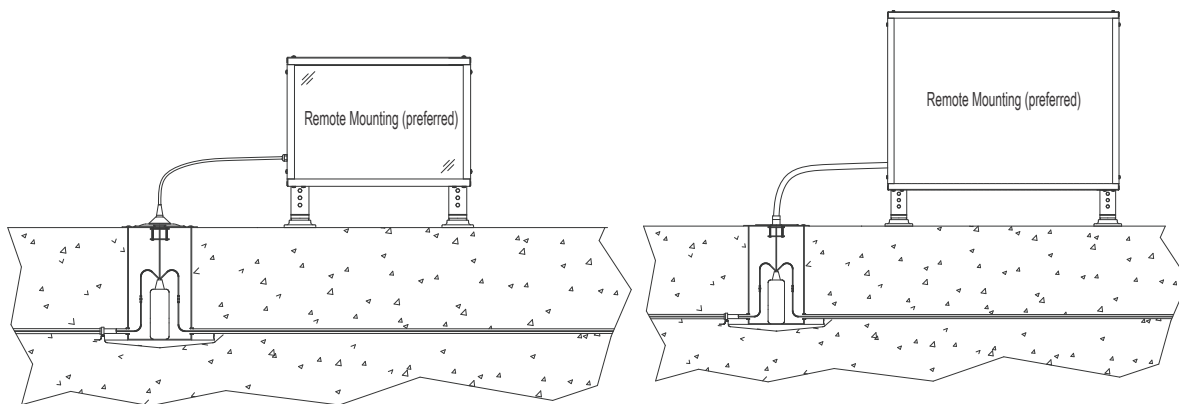
- Read and carefully follow the instructions throughout this manual for performing specific tasks and working with specific equipment.
- Follow all applicable safety procedures required by your company, industry standards and government or other regulatory agencies.
- Install all electrical connections to local code.
- Use only electrical wire of sufficient gauge and insulation to handle the rated current demand. All wiring must meet local codes.
- 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 warnings may result in serious injury or equipment damage.

Each sign is furnished complete with mounting flanges for installation on a concrete pad, or on a transition plate (typically used for Canadian applications), contact the ADB SAFEGATE sales department for more details. Contact the ADB SAFEGATE Sales Department for more information on sign installation hardware. Shown in [Figure 1](#) - [Figure 5](#).

See [Figure 4](#) for Detail B and [Figure 5](#) for Detail C.

Figure 1: Direct/Remote Mounting



This section provides instructions for installing L-858 taxiway and runway signs. Refer to the airport project plans and specifications for the specific installation instructions.

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 Cord Set Installation

This subsection provides information for installing cord sets. It includes sign installation kit reference numbers for three power leg cord set installation locations and mounting configurations.

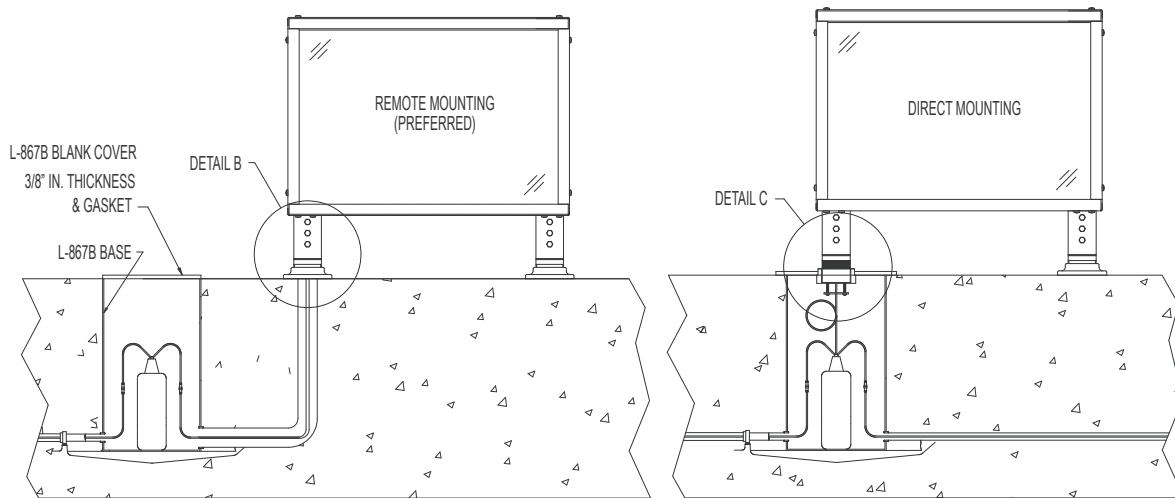
This subsection provides special cord set locations with parts and part numbers.

See [Figure 24](#) for the ordering code for the ICAO sign. Special cord set installation reference numbers are shown in the ordering code.

3.2.1 Cord Set Exit Location #1 and 2

[Figure 2](#) shows cord set location #1. See [Figure 3](#) for Detail D and E.

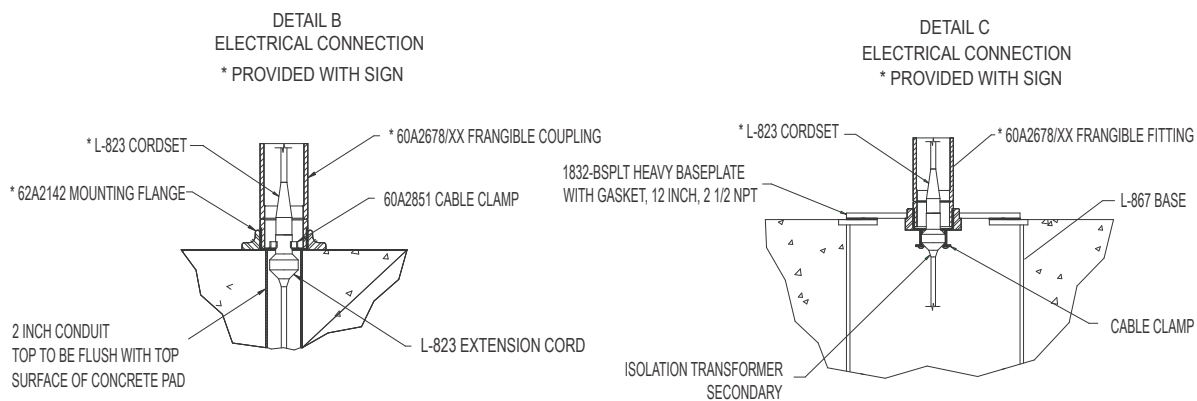
Figure 2: Cord set Location #1 and 2 (Non-typical)



3.2.2 Cord set Connections #1 and 2

[Figure 3](#) shows cord set location #2.

Figure 3: Cord set Connections #1 and 2 (Non-typical)

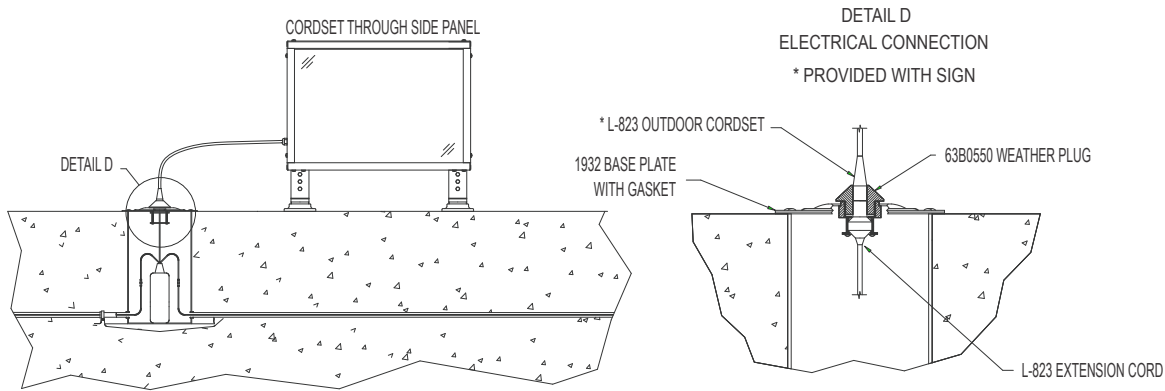


3.2.3 Cord set Exit Location #3

Figure 4 shows cord set location #3.

Note
Preferred Method.

Figure 4: Cord set Location #3 (Standard)

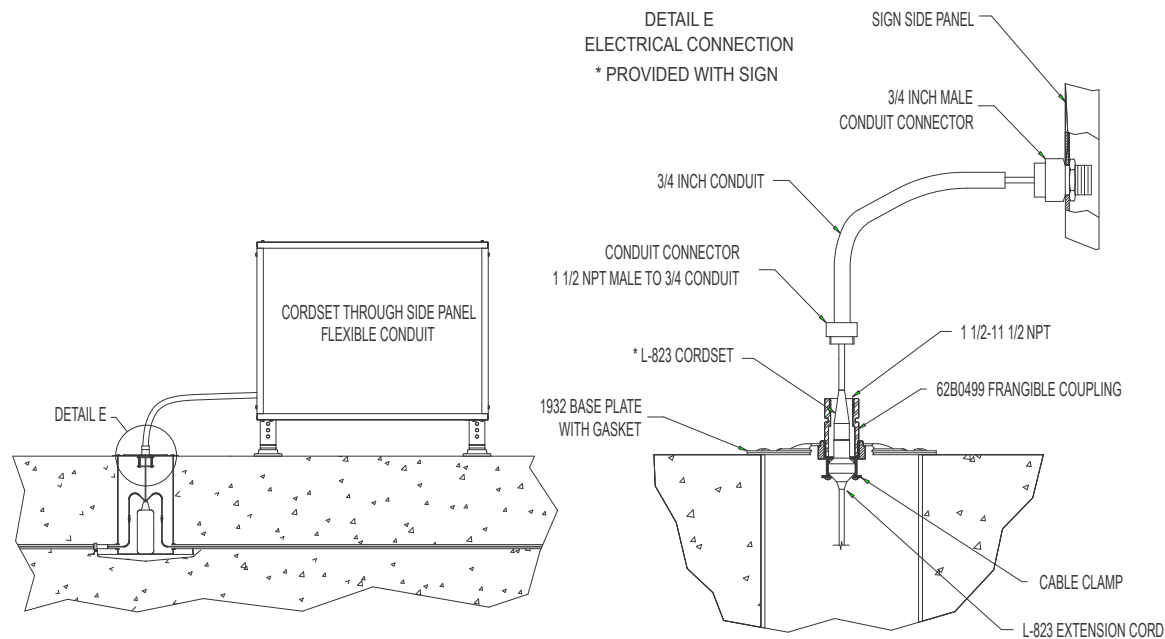


3.2.4 Cord set Exit Location #4

Figure 5 shows cord set location #4.

Note
Preferred Method.

Figure 5: Cord set Location #4 (Standard)



3.3 Cord sets and Extension Cords

See [Figure 6](#) . Refer to [Table 1](#) for cord set and extension cord types. Refer to [Table 2](#) for cord set and cord parts.

Figure 6: L-823 Cord set and Extension Cords

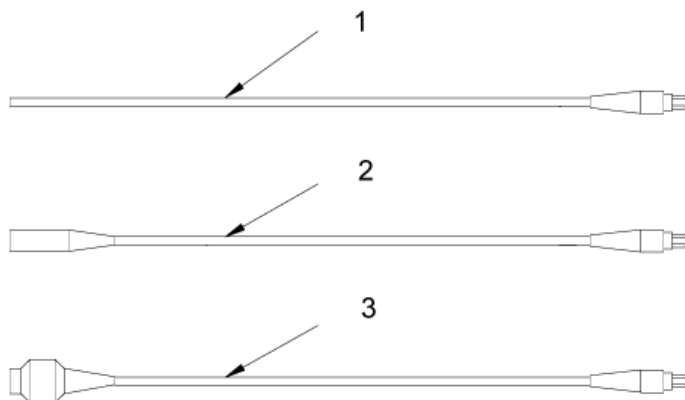


Table 1: Cord set and Extension Cord Length

Type	Part Number	Receptacle Style	Plug Style	Standard Length	Wire
1	73A0107-72 73A0107-98	Not applicable	Type II, Class A, Style 1	6 ft. (1.8 m) 8 ft. (2.4 m)	16/2
2	73A0108-X	Type II, Class A, Style 7	Type II, Class A, Style 1	8 ft. (2.4 m)	16/2
3	73A0109-X	Type II, Class A, Style 8	Type II, Class A, Style 1	8 ft. (2.4 m)	16/2

Table 2: Cord set and Extension Cord Parts

Item	Description	Part Number	Note
1	L-823 cord set, 16/2 wire		
	Cord set, standard size 6 ft. (1.8 m)	73A0107-72	A, B
	Cord set, standard size 8 ft. (2.4 m)	73A0107-98	A, B
2	L-823 cord set extension cord, 16/2 wire, standard size 8 ft. (2.44 m)	73A0108-8	A, C
3	L-823 cord set extension cord, 16/2 wire, standard size 8 ft. (2.44 m)	73A0109-8	A, D

i Note

A: Other sizes require special order.

B: A minimum of thirty inches (762 mm) of cord set length is required for internal sign connections. Usable exterior cord set length is equal to the cord set length minus a minimum of 30 inches (varies with sign size and cord set exit location).

C: Receptacle may be connected to plug on 73A0107-XX, 73A0109-8 cord set, or standard 31-inch (787.4 mm) L-823 cord set.

D: Receptacle must be connected to plug on, Plug Type II, Class A, and Style 1, supplied with the sign.

3.4 General Guidelines



WARNING

Equipment Damage

Read the safety instructions in their entirety before continuing.

- 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, 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 or a transition plate.
- Do not allow concrete edges to protrude above grade.
- The preferred method to connect power to the signs is through a breakaway cable connectors installed within the frangible coupling portion of the sign 's mounting legs.
- Install auxiliary equipment, such as isolation transformers, in a light base embedded in the ground or in a separate pull pit.

3.4.1 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 ICAO Annex 14 or Transport Canada TP312. 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.

3.4.2 Dimension Diagrams for Installation

Figure 7: 600 mm Signs

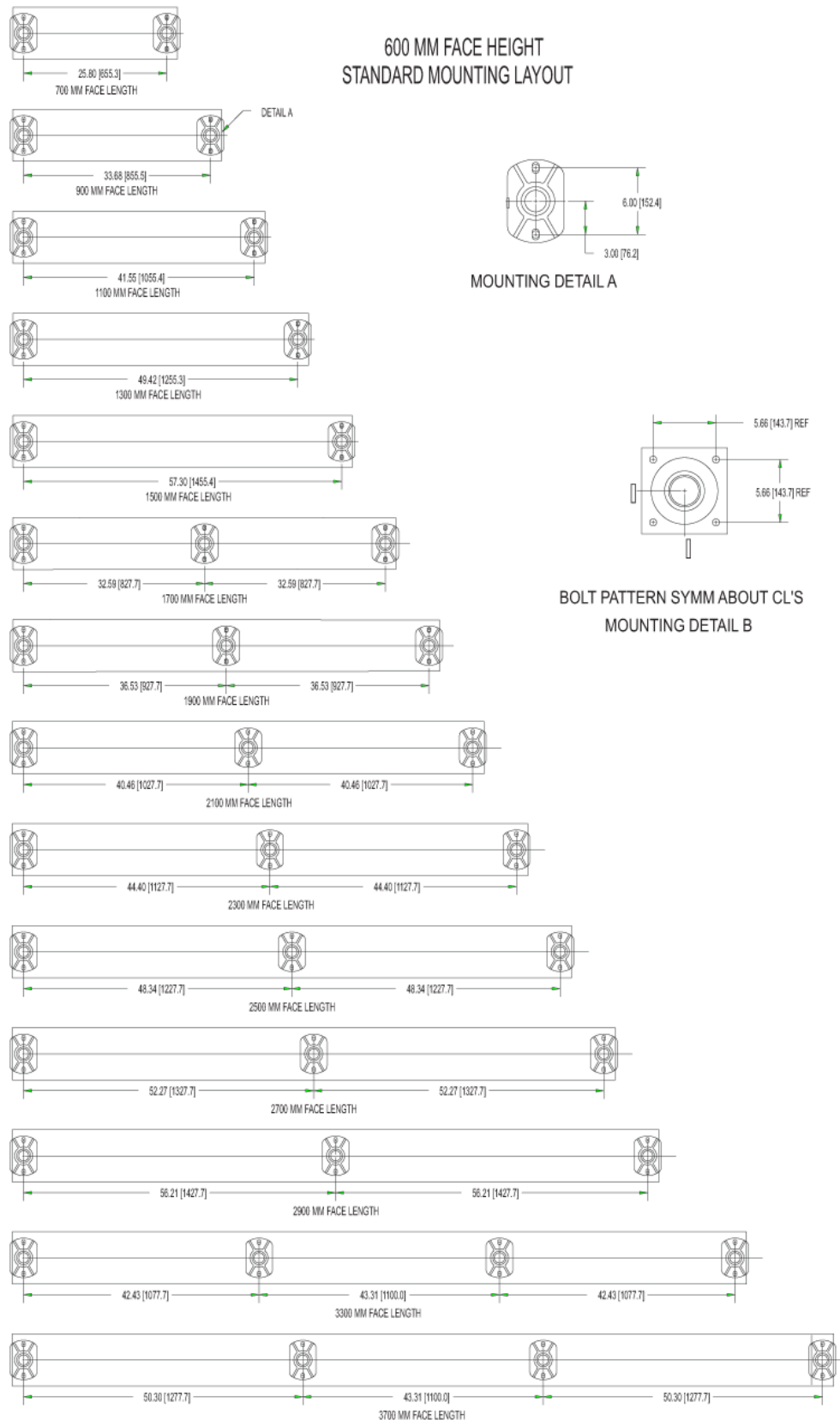


Figure 8: 600 mm Signs

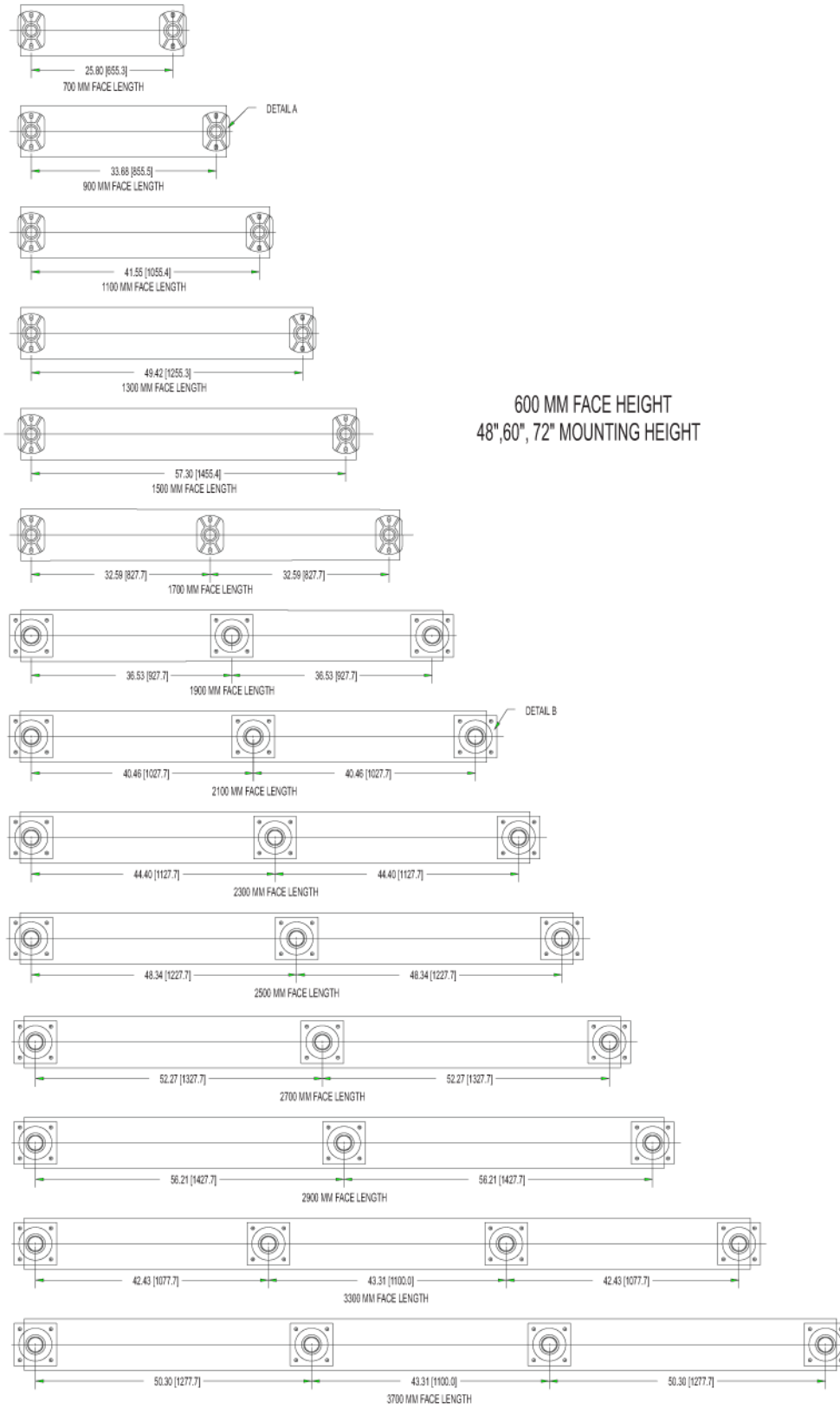


Figure 9: 800 mm Signs

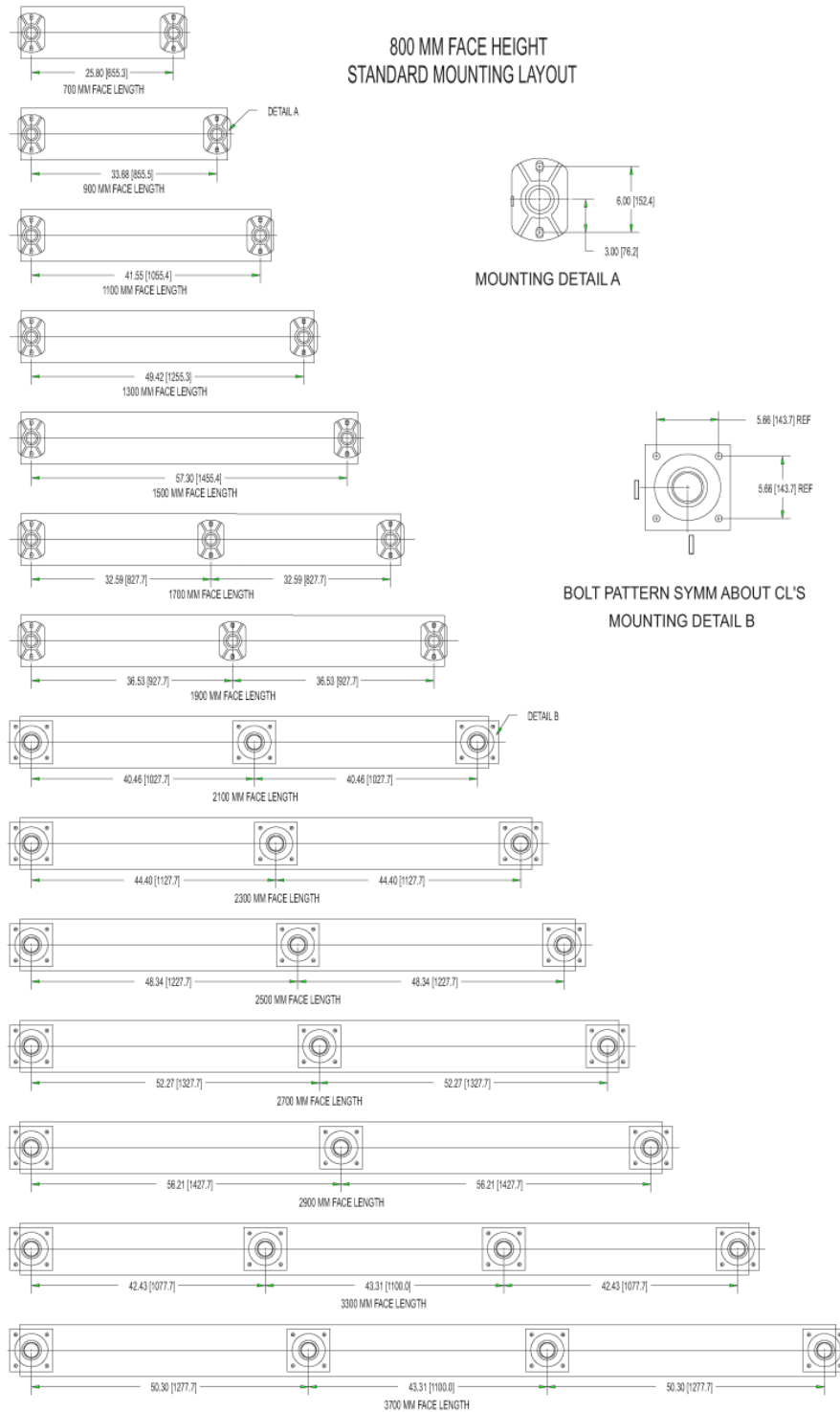
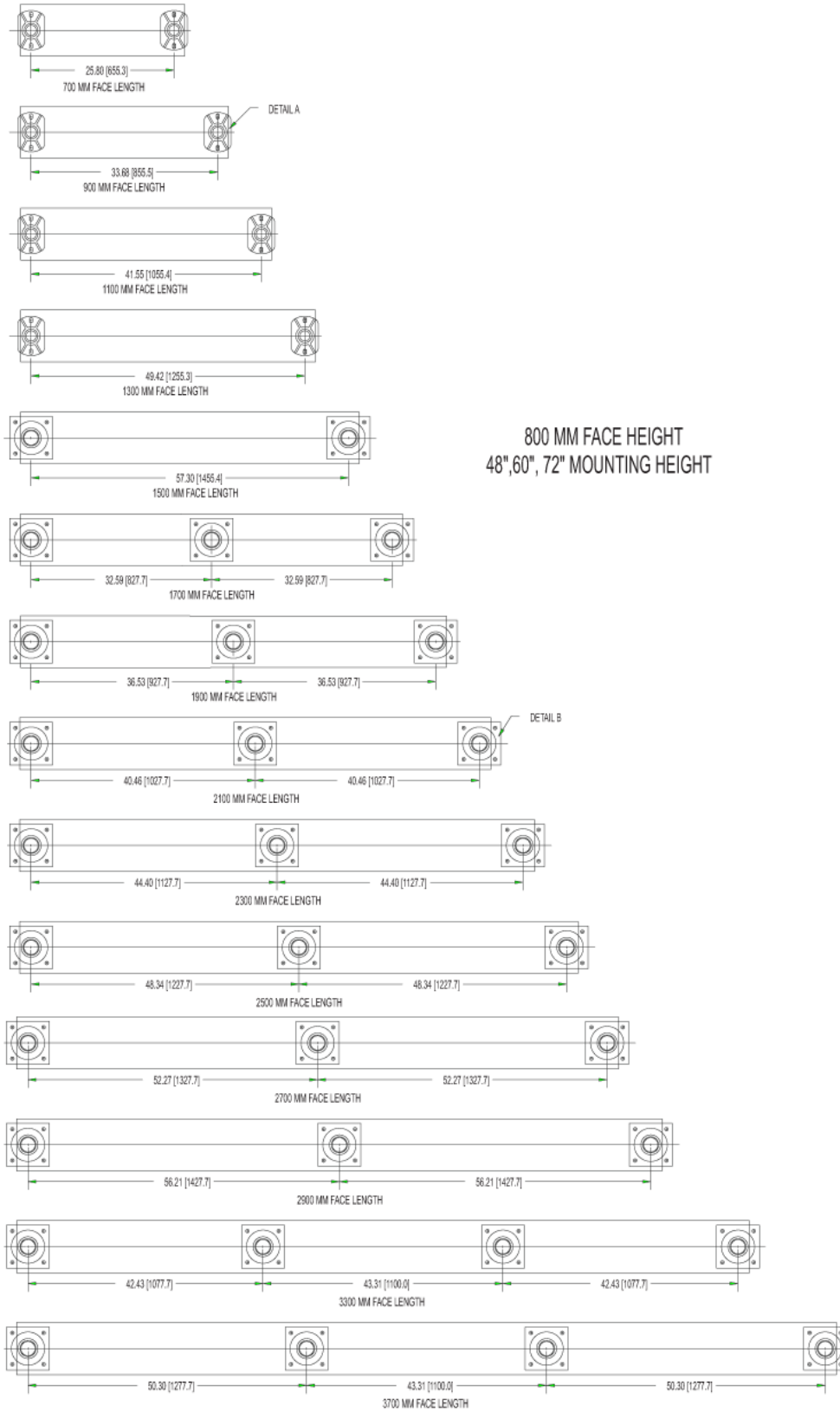


Figure 10: 800 mm Signs



3.4.3 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.



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 light base is immediately under the power leg or is at the same end, but not under 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.

3.4.4 Sign Distance from Pavement Edge

Refer to ICAO Annex 14 or Transport Canada TP312 for information on the location of different types of taxiway signs.

ICAO

Table 5-4 of ICAO Annex 14, Volume I should serve as a basis for determining the location of the guidance signs.

This table gives the perpendicular distance from defined taxiway / runway pavement edge to near side of sign.

Location

Exact location and orientation have to be determined on site, jointly by the contractor and the project management and finally approved by the Airport Authority (generally the Ground Traffic Control Manager).

Other Considerations

Unobstructed sign legibility and protection from direct exhaust blast are other considerations to be taken into account as well.

3.4.5 Sign Installation on a Concrete Pad



Note

Follow site plans and specifications for concrete dimensions.

3.4.6 Concrete Pouring

See the site plans.

To pour a concrete pad, perform the following procedure:

1. Determine the sign size and overall length.
2. Pour your concrete pad according to the following requirements:
 - A minimum of 30 inches (762 mm) wide, extending a minimum of 6 inches (152.4 mm) beyond the end of the supports. The sign pad needs to be flat and level in the area where the sign mounting flanges are located. The mounting floor flange is nominally 5.0 wide x 7.50 long and the area beyond the flange can be tapered to the outside edge of the concrete pad to provide for pad drainage.
 - A minimum of 4 inches (101.6 mm) depth, extending below the frost line to prevent frost heave.
 - Reinforce according to site plans and specifications.
3. Install a minimum of one 12-inch (304.8 mm) L-867B power base (1) according to the following guidelines:
 - Install the base close to the sign in or near the concrete pad to provide easy access to the isolation transformer.



Note

When installing the base in the concrete pad, hold the L-867 base firmly in place during construction of the pad so that the upper surface of the base flange is level within ± 2 degrees and not more than 3/8 inch (9.525 mm) above the concrete surface.

- All other bearing surfaces on the pad for additional flange supports should be kept in the same horizontal plane as the L-867 base flange. The pad area where the sign mounting flanges will be located is to be flat **with no taper** to ensure that the sign will set level to prevent uneven loading on the frangible couplings.
- Refer to “[Dimensions](#)” for the base dimensions and the base flange used for each sign.

Before the concrete sets, install two 1/2-13 anchor bolts into the concrete pad. The bolt hole centerline is on a 6-inch (152.4 mm) diameter bolt circle, 180 degrees apart as shown. Bolt slots are 0.62-inches wide x 1.0 long. Overall width of flange is 5.0 inches (127 mm) and overall length is 7.5 inches (190.5 mm). Bolts should be located perpendicular to the sign face.



Note

A customer-supplied template is recommended to hold the bolts in position while the concrete sets. See “Dimension Diagrams for Installation” on page 35 for additional base flange dimension details. 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 or, equivalent 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.

Example Hilti Kwik Bolt 3 Standard Thread 304 Stainless Steel



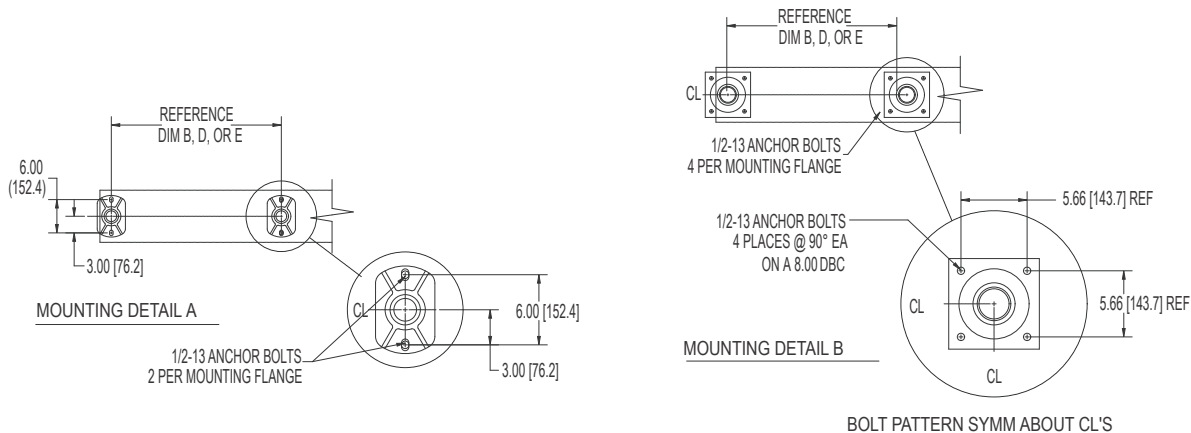


Note

With either anchoring system, the allowable load for any specific bolt length is dependent upon several factors; type of concrete, depth of embedded bolt, edge distance, anchor spacing, etc. Due to these factors, the airport engineer must select the appropriate bolt length. The bolt length is selected based on the local site conditions and the wind load force on the face of the sign. For additional information see the application drawing 117A0069 on the ADB Safegate Web site Product Center at:

<http://www.adbsafegate.com>

Figure 11: Two-hole (62A2142) and 4-hole (62A2146) Signs Couplings,



3.4.7 Sign Mounting



Note

Signs are fully assembled at the factory and are ready for installation with the exception of signs requiring a leg extension. Leg extensions are shipped with the sign and are easily added to raise the sign to the Canadian height requirement. Mounting flanges may be removed to lubricate the threads of the frangible coupling with anti-seize compound before installing the sign.

If the male L-823 connector is routed through a leg, slide the frangible coupling over the male connector and insert it into the female connector in the base plate, and then screw the frangible coupling into the base plate.

To mount the sign onto the concrete pad to ensure 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 12. 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 where 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 the ADB Safegate Sales Department for further assistance.

Figure 12: 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 an AWG 6 (16.0 mm²) (minimum) ground wire to the earth ground lug on the bottom of the sign. Refer to [Wiring Diagrams](#) for electrical connections on a series circuit installation.



WARNING

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

4. Install optional tether. Refer to *Optional Tethers* in this section.
5. Plug the cord set into the sign and the transformer.
6. Reinstall panels (if removed) and top lid (if removed).

3.5 Wiring

Refer to [Wiring Diagrams](#) for wiring diagrams.

When installing cable, follow the guidelines below.

- 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, see [“Electrical Supply”](#). If installation is to be independent of other lighting circuits, use current edition of ICAO Annex 14 or TP312 for additional guidance.

3.6 Series Wiring Isolation Transformers

The following section applies only to signs that require two isolation transformers and in some installations where it is desirable to replace one high-wattage isolation transformer with two lower-wattage isolation transformers.

For larger signs that require two isolation transformers for operation the two isolation transformers shall be wired in series to provide the total wattage required for operation. If unsure of the isolation transformer(s) required for the sign, refer to the Sign Load & Transformer Requirements section in this user manual.

When a high-wattage isolation transformer is required, it is permissible to use two lower-wattage isolation transformers instead. This can only be done if they are series-wired and provided the total wattage of the two isolation transformers equals the isolation transformer it is replacing. For example, you can replace the 500 W isolation transformer with series-wired 300 W and 200 W isolation transformers.

Note On occasion, the windings in the Isolation Transformers may be wired differently. The result will be that the output voltage on the secondary of the isolation transformer will be out of phase when the two transformers are in series. This condition will result in improper operation of the sign. This situation is resolved by replacing the field splice kit on one of the transformer's secondary and reversing the wires.

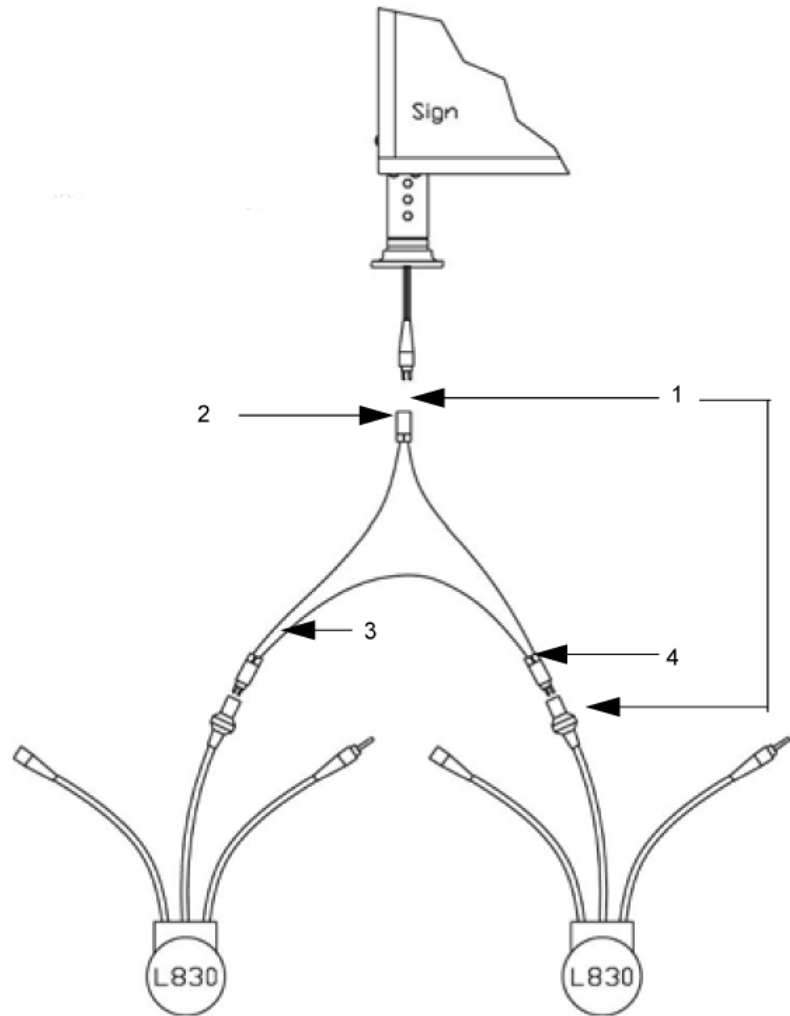
See [Table 3](#) for kits/parts required for series wiring isolation transformers. See [Figure 13](#) for series wiring isolation transformer installation.

Table 3: Series Wiring Isolation Transformer Kits

Item	Description	Part Number	Quantity
1	L-830 series wire kit	94A0173	1
2	Style 11 receptacle kit	70A0046	1
3	Jumper wire	89A0154	6 feet
4	Style 4 plug kit	70A0045	2

Note See above concerning phasing when transformers are in series.

Figure 13: Series Wiring Isolation Transformer Installation





Note

Male cord-set supplied with the sign.

3.7 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 6, (16.0 mm²) (minimum) earth ground wire to the sign. If necessary, you may remove the ground lug from the outside and place it on the inside of the sign.



3.8 Optional Tethers

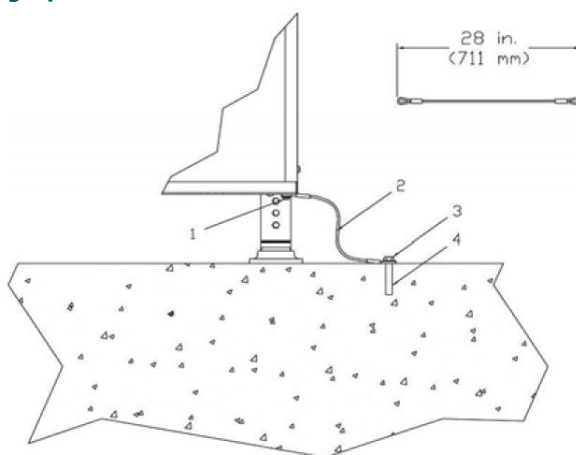
See [Figure 14](#) . Tethers are shipped installed on the sign according to the option specified on the sales order. Location and quantity of the tethers are determined when the sales order is placed.



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 14: Installing Optional 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.

4.0 Maintenance and Repair



WARNING

Injury or Equipment Damage

Read installation instructions in their entirety before starting maintenance.

- Read and carefully follow the instructions throughout this manual for performing specific tasks and working with specific equipment.
- Follow all applicable safety procedures required by your company, industry standards and government or other regulatory agencies.

This equipment may contain electrostatic sensitive devices.

- Protect PCBs 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.
- The tip of the soldering iron must be grounded.
- Electronic modules and components must be stored and transported in conductive packing.
- Do not replace components with the power on.

Failure to follow these warnings may result in serious injury or equipment damage.

This section provides preventive maintenance for the ICAO/TP312 LED signs.

To keep the taxiway and runway signs operating efficiently, follow a preventive maintenance schedule. Refer to [Table 4](#).

Table 4: L-858 Taxiway and Runway Sign Maintenance

Interval	Maintenance Task	Action
Daily	Visually check for failed LED assemblies.	Repair or replace the affected circuit component such as the power supply PCB or the Light Bar.
Monthly	Check for dirty panels or dust and dirt inside the sign.	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.
Annually	Check for paint flaking off.	Repaint.
	Check for panels yellowing.	Clean with Formula 409 or similar cleaning agent capable of cleaning grease and dirt off of the panels.
	Check for deteriorated gaskets.	Replace gaskets.



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)

4.1 Replacing an LED Light Bar

1. Turn off the power to the sign.
2. Remove the top cover.
3. Remove the sign face.
4. Disconnect the power connector from the LED light bar being replaced.
5. Drill out the the pop rivets 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 pop rivets



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 diagrams [Figure 19](#) - [Figure 21](#).
 9. Replace the panels, top cover and restore the power to the sign.

Figure 15: Three Sizes of Light Bars



Note

Torque the top panel/lid bolts to 50 ±5 lb/in (5.7 ±0.6N·m)

4.2 Replacing the Single Power Supply



DANGER

Never replace a power supply with power applied to the sign.

-
1. Disconnect the wires from the power supply.
 2. Remove the old power supply by removing the four #8-32 screws with lock washers installed in the PEM nuts of the power supply. Retain for future use. See [Figure 16](#).
 3. Apply thermal compound to the mating surface of the power supply to ensure good heat transfer to the frame.
 4. Locate the four threaded PEM nuts installed in the mounting bracket of the Power Supply and align the PEM nuts with the mating holes in the end panel of the sign.
 5. Insert the four #8-32 screws with lock washers through the holes in the end panel and screw them into the PEM nuts.
When tightening the screws, make sure the Power Supply is seated flat against the side of the sign.



CAUTION

Be careful that the screws do not bind as you are tightening. This may give the impression that the power supply is firmly mounted when it is not!

4.2.1 Wiring the Single Power Supply

See [Wiring Diagrams](#).

1. Locate the input power wires (from the isolation transformer secondary). Connect these wires to the Power Supply terminals labeled "AC INPUT". This is the isolated 6.6A input. Polarity does not matter. They must go through the cover.
2. Locate the wires that connected the DC Supply to the first LED light bar. Connect these wires to the Power Supply terminals labeled "OUTPUT". They must go through the cover.



Note

This is a DC current source, and polarity does matter.

3. Check the position of the shunt on P1. See [Figure 16](#) below.



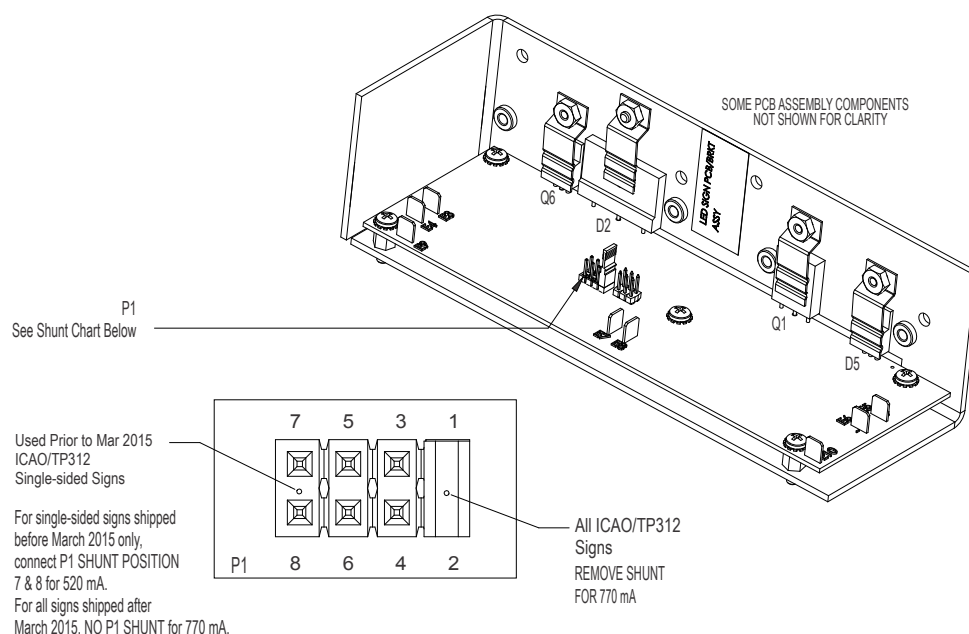
Note

For signs shipped prior to March 2015 the PCB outputs either 520mA DC (single-side sign) or 770mA DC (double-sided sign) as set by shunt on P1 on the power supply.

For signs shipped after March 2015 the PCB outputs 770mA DC (single-sided and double-sided signs) as set by no shunts on P1 on the power supply.

- a) For ICAO/TP312 signs shipped prior to Mar 2015, signs operate at 520 mA. If field replacing the Power Supply, remove the shunt on P1 position 1 & 2. and connect to position 7 & 8. This will ensure that the brightness of the sign will not change.
 - b) For ICAO/TP312 signs shipped after Mar 2015, signs operate at 770 mA. If field replacing the Power Supply, ensure no shunt on P1 is connected at positions 1 & 2, or 7 & 8. This will ensure that the brightness of the sign will not change.
4. Verify that the sign wiring matches the [Wiring Diagrams](#).
 5. You are now ready to apply power to the sign.

Figure 16: 44A7260/010 Single Power Supply Shunt Position



(see wiring diagram 43A4143 Figure 19)



Note

For the Dual-Power Supply (see [Replacing the Dual Power Supply](#)).

4.2.2 Checking the Power Supply

When power is applied...

- All of the LED light bars should illuminate and the on board LED (D4) will stay off if all components are wired and functioning correctly.
- If the LED light bars do not illuminate and the on board LED (D4) comes on, there is an open in the output current loop to the LED light bars. Remove the input power and check the output wiring for correct polarity and opens or shorts referring to [Wiring Diagrams](#) .
- If the LED light bars do not illuminate and the on board LED (D4) does not illuminate, then there is a fault on the power supply board or incoming power. Remove the input power and check the input wiring for opens or shorts.
- Verify the P1 shunt is configured properly. See [Figure 16](#).

4.3 Replacing the Dual Power Supply



DANGER

Electric Shock

Never replace a power supply with power applied to the sign.

1. Remove the four #8-32 screws with lock washers installed in the PEM nuts of the power supply. Retain for future use. See [Figure 17](#).
 2. Apply thermal compound to the mating surface of the power supply to ensure good heat transfer to the frame.
 3. Locate the four threaded PEM nuts installed in the mounting bracket of the Power Supply and align the PEM nuts with the mating holes in the end panel of the sign.
 4. Insert the four #8-32 screws with lock washers through the holes in the end panel and screw them into the PEM nuts. When tightening the screws, make sure the Power Supply is seated flat against the side of the sign.
-



CAUTION

Equipment Damage

Be careful that the screws do not bind as you are tightening. This may give the impression that the power supply is firmly mounted when it is not!

4.3.1 Wiring the Dual-Power Supply

See [Wiring Diagrams](#) .

1. Locate the input power wires (from the isolation transformer secondary). Connect these wires to the Power Supply terminals labeled "AC INPUT". This is the isolated 6.6A input. Polarity does not matter.
 2. Locate the wires that connected the DC Supply to the first LED light bar. Connect these wires to the Power Supply terminals labeled "OUTPUT".
-



CAUTION

This is a DC current source, and polarity does matter.

3. Check the position of the shunt on P1. See [Figure 17](#).
-



Note

For signs shipped prior to March 2015 the PCB outputs either 520mA DC (single-side sign) or 770mA DC (double-sided sign) as set by shunt on P1 on the power supply.

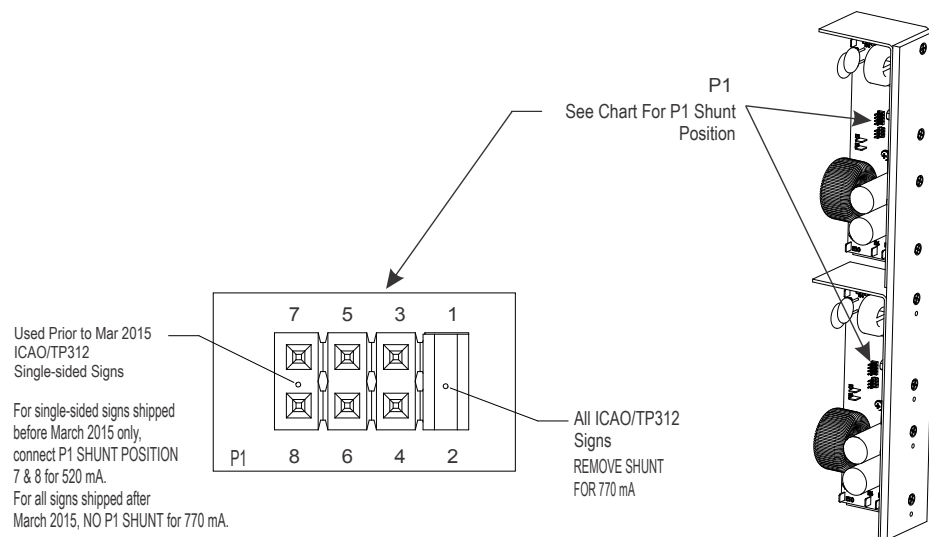
For signs shipped after March 2015 the PCB outputs 770mA DC (single-sided and double-sided signs) as set by no shunts on P1 on the power supply.

- For ICAO/TP312 signs shipped prior to Mar 2015, signs operate at 520 mA. If field replacing the Power Supply, remove the shunt on P1 position 1 & 2. and connect to position 7 & 8. This will ensure that the brightness of the sign will not change.
- For ICAO/TP312 signs shipped after Mar 2015, signs operate at 770 mA. If field replacing the Power Supply, ensure no shunt on P1 is connected at positions 1 & 2, or 7 & 8. This will ensure that the brightness of the sign will not change.

4. Verify that the sign wiring matches [Figure 21](#).

5. You are now ready to apply power to the sign.

Figure 17: 44A7417-10 Sign Dual Power Supply Shunt Position



4.3.2 Checking the Dual Power Supply

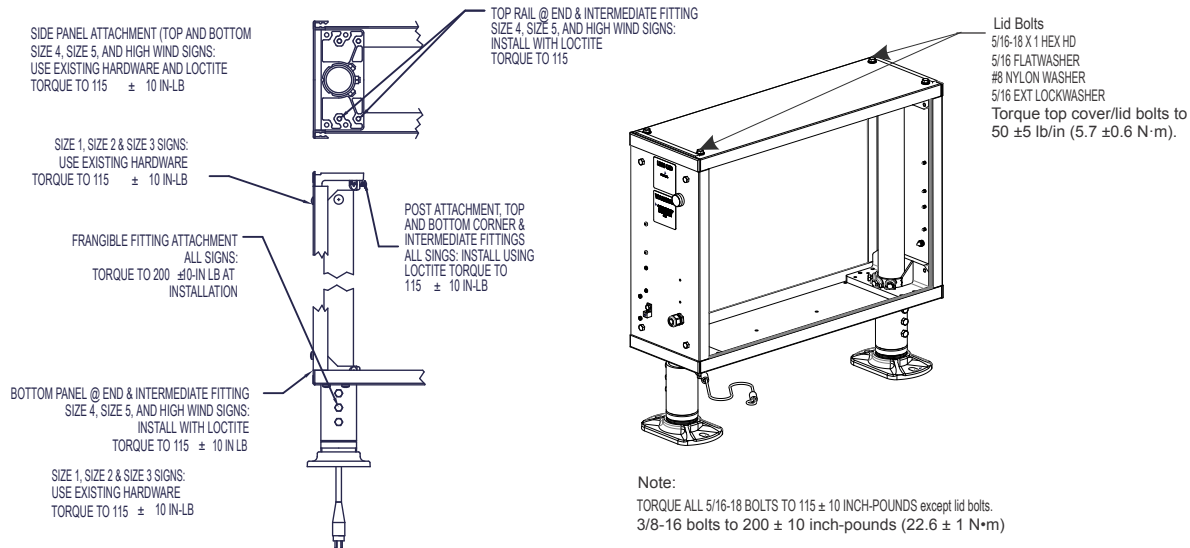
When power is applied...

- All of the LED light bars should illuminate and the on board LED (D4) will stay off if all components are wired and functioning correctly.
- If the LED light bars do not illuminate and the on board LED (D4) comes on, there is an open in the output current loop to the LED light bars. Remove the input power and check the output wiring for correct polarity and opens or shorts referring to [Figure 21](#).
- If the LED light bars do not illuminate and the on board LED (D4) does not illuminate, then there is a fault on the power supply board or incoming power. Remove the input power and check the input wiring for opens or shorts.
- Verify the P1 jumper on the power supply is configured properly. See [Figure 17](#).

4.4 Sign Bolt Torque Diagram

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

Figure 18: 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 Troubleshooting



WARNING

Electrical Shock

Read installation instructions in their entirety before starting maintenance or repairs.

- Read and carefully follow the instructions throughout this manual for performing specific tasks and working with specific equipment.
- Follow all applicable safety procedures required by your company, industry standards and government or other regulatory agencies.

This equipment may contain electrostatic sensitive devices.

- Protect PCBs 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.
- The tip of the soldering iron must be grounded.
- Electronic modules and components must be stored and transported in conductive packing.
- Do not replace components with the power on.

Failure to follow these warnings may result in serious injury or equipment damage.

This section provides troubleshooting information for the taxiway and runway 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 representative for help.

5.1 Theory of Operation

See [Figure 14](#) and the schematics shown in [Figure 19](#) and [Figure 21](#). A current of 2.8 to 6.6 A is the input into the power supply PCB.



Note

For signs shipped prior to March 2015 the PCB outputs either 520mA DC (single-side sign) or 770mA DC (double-sided sign) as set by shunt on P1 on the power supply.

For signs shipped after March 2015 the PCB outputs 770mA DC (single-sided and double-sided signs) as set by no shunts on P1 on the power supply.

All LED light bars are connected in series. Each light bar has a number of internally connected white LEDs connected in series. The positive (+) output of the DC power connects to the anode of all the LED light bars in series.

Table 5: Troubleshooting Chart

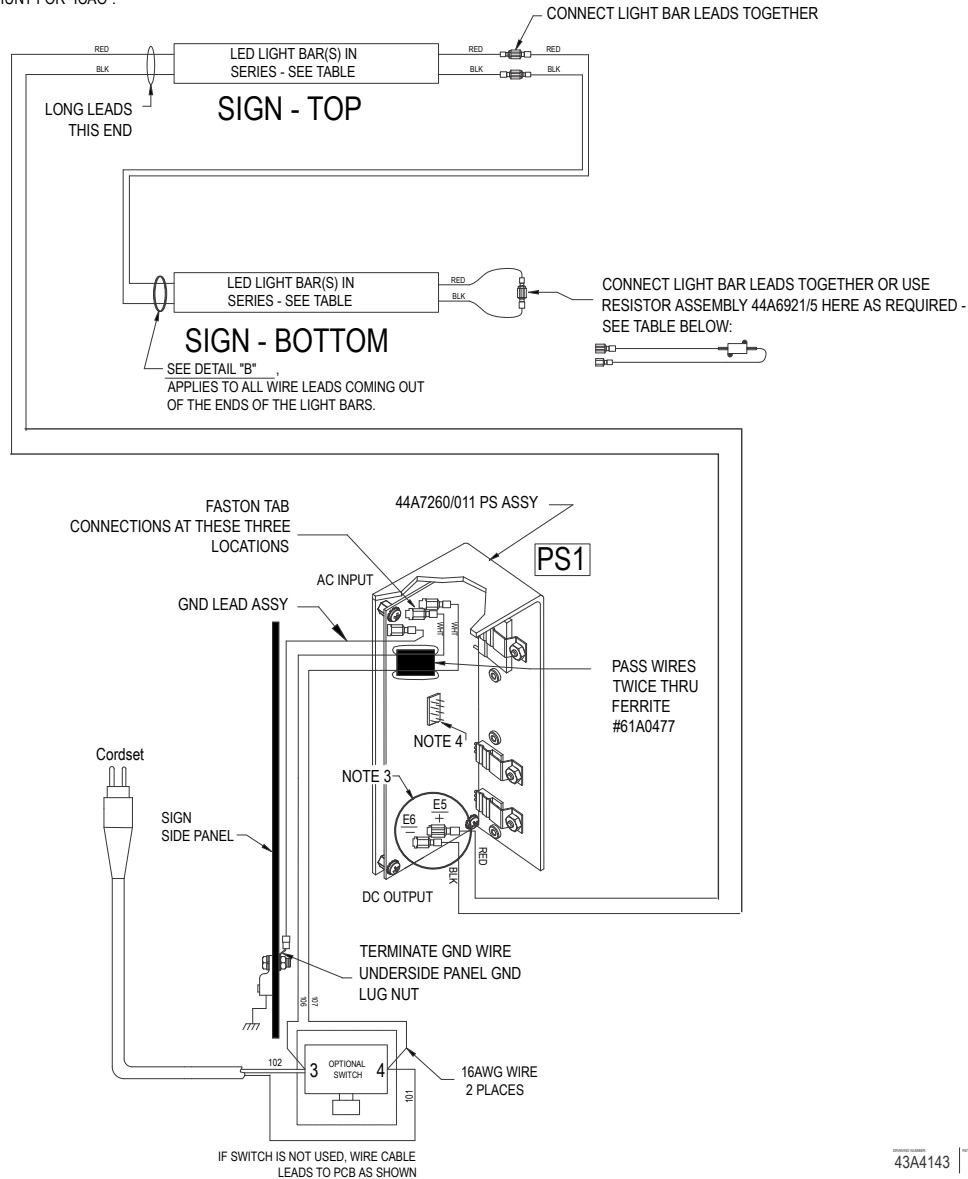
Problem – LED Signs	Possible Cause	Corrective Action
1. All LEDs are out or not functioning correctly.	Loose wires or connections	Tighten or replace wires.
	CCR circuit-shortcd	Check circuit operation.
	Sign ON/OFF switch is closed.	Check the Sign ON/OFF switch for proper operation. Replace if necessary.
	Power Supply fault	See Figure 17 . With field current on, measure the voltage at E7 with respect to E8, see Figure 17 . E7 will be 10 VDC to 13 VDC on a properly operating power supply when powered. Next, the power supply can be checked for operation by performing the following: Remove input power, disconnect the output LED load at E6 and E5. Connect a DC volt meter from E8 to E5. Look for a rising voltage to approximately 195 VDC within the first few seconds of powering on the board. This voltage will then drop to less than 50 VDC and the on board LED (D4) will light within a few seconds. If the voltage was between 50-195 VDC during the first few seconds of applying power, then the power supply is likely good. Note: the voltage at E8-E5 will cycle again about 40 seconds after dropping to less than 50 VDC and repeat five times and will stabilize. The input power must be cycled off for about 1 minute to get the output to cycle on again. Follow the correct polarity when reconnecting the LED panels.
	LED Light Bar fault	The power supply PCB LED (D4) will illuminate when there is an open in the output LED light bar string. Swap out a known good LED light bar assembly until the bad LED light bar assembly is found. Follow correct polarity when reconnecting.
2. LED sign is dim on a dual power supply sign.	LED Light Bar fault or 1/2 of the Dual Power Supply fault	<div> CAUTION Never connect a single LED light bar directly to the power supply without the series resistor connected! This can cause LED degradation failure. </div>
	P1 has a shunt.	Remove the shunt on P1.
		It is highly recommended to use the Light Bar Tester 44A7264-1 to test a single light bar.

6.0 Wiring Diagrams

Figure 19: LED ICAO Sign, Single Power Supply and Light Engine Diagram

NOTES:

- 1) THE L823 CONNECTION TO THE PCB DOES NOT REQUIRE POLARIZATION.
- 2) THE LAST LIGHT BAR OF THE "CHAIN" ENDS WITH A "RESISTOR ASSY" OR THE LEADS ARE CONNECTED TOGETHER.
- 3) CHECK LIGHT BAR LEAD CONNECTIONS (WIRE TO TERMINAL, AND TERMINAL TO TAB) TO THE PWR SUPPLY FOR TIGHTNESS. CRIMP/SQUEEZE THE TERMINAL CONNECTION WITH PLIERS TO TIGHTEN TO TAB; REPLACE TERMINAL IF WIRE IS REMOVED.
- 4) REMOVE P1 SHUNT FOR "ICAO".



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Figure 20: Detail B

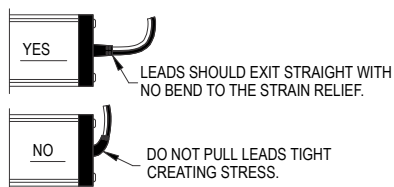


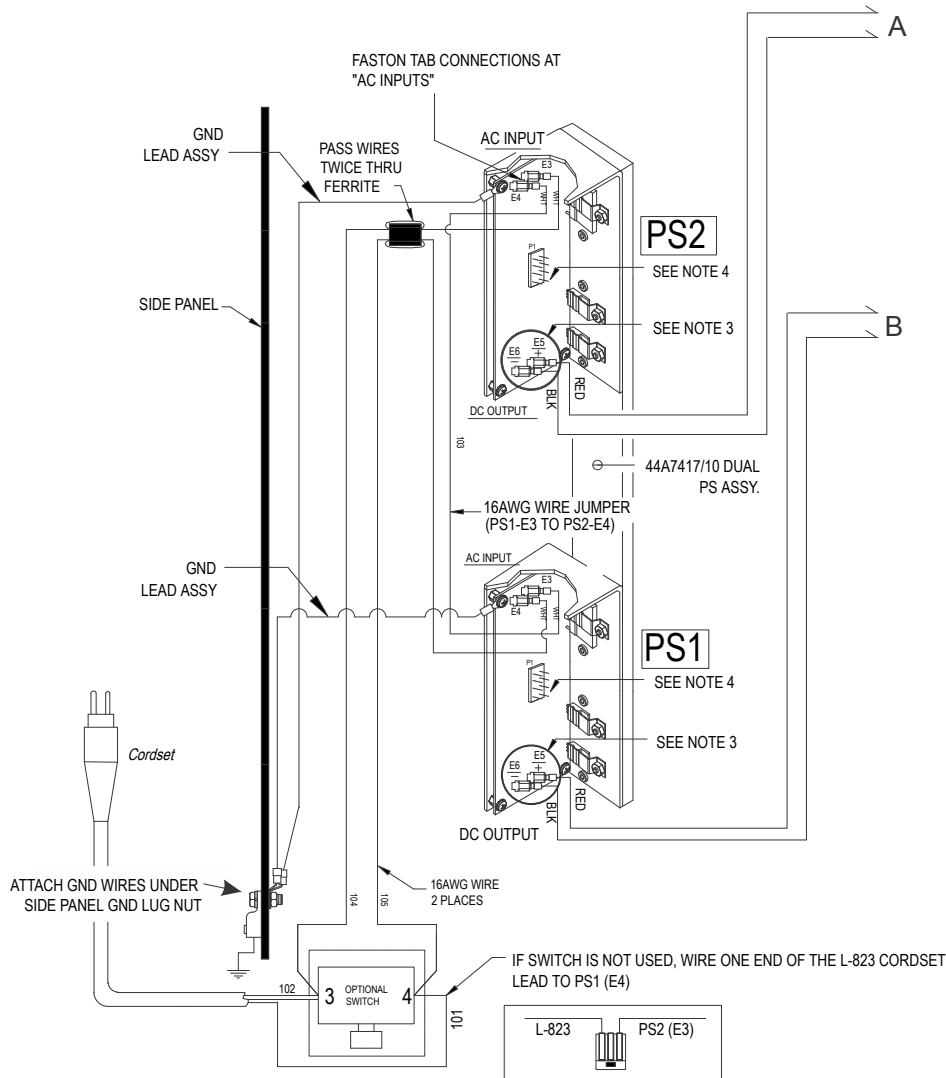
Table 6: Power Supply: LED Light Bar and Termination Chart

Sign Length	48A0442/16	Light Bars 48A0442/24	48A0442/32	Sections	Light Bars Top	per Section Bottom	Termination
700	2	-	-	1	(16)	(16)	44A6921/5
900	-	2	-	1	(24)	(24)	44A6921/5
1100	-	-	2	1	(32)	(32)	Connect Leads
1300	2	2	-	1	(16) + (24)	(16) + (24)	Connect Leads
1500	-	4	-	1	(24) + (24)	(24) + (24)	Connect Leads
1700	-	4	-	2	(24)	(24)	Connect Leads
1900	-	4	-	2	(24)	(24)	Connect Leads
2100	-	-	4	2	(32)	(32)	Connect Leads
2300	-	-	4	2	(32)	(32)	Connect Leads

Figure 21: LED ICAO Sign, Dual-Power Supply Diagram

NOTES:

- 1) THE L823 CONNECTION TO THE PCB DOES NOT REQUIRE POLARIZATION.
- 2) THE LAST LIGHT BAR OF THE "CHAIN" ENDS WITH A "RESISTOR ASSY" OR THE LEADS ARE CONNECTED TOGETHER.
- 3) CHECK LIGHT BAR LEAD CONNECTIONS (WIRE TO TERMINAL, AND TERMINAL TO TAB) TO THE PWR SUPPLY FOR TIGHTNESS. CRIMP/SQUEEZE THE TERMINAL CONNECTION WITH PLIERS TO TIGHTEN TO TAB; REPLACE TERMINAL IF WIRE IS REMOVED.
- 4) REMOVE P1 SHUNT FOR "ICAO".



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| I

Figure 22: LED ICAO Sign, Dual Power Supply Light Engine Diagram

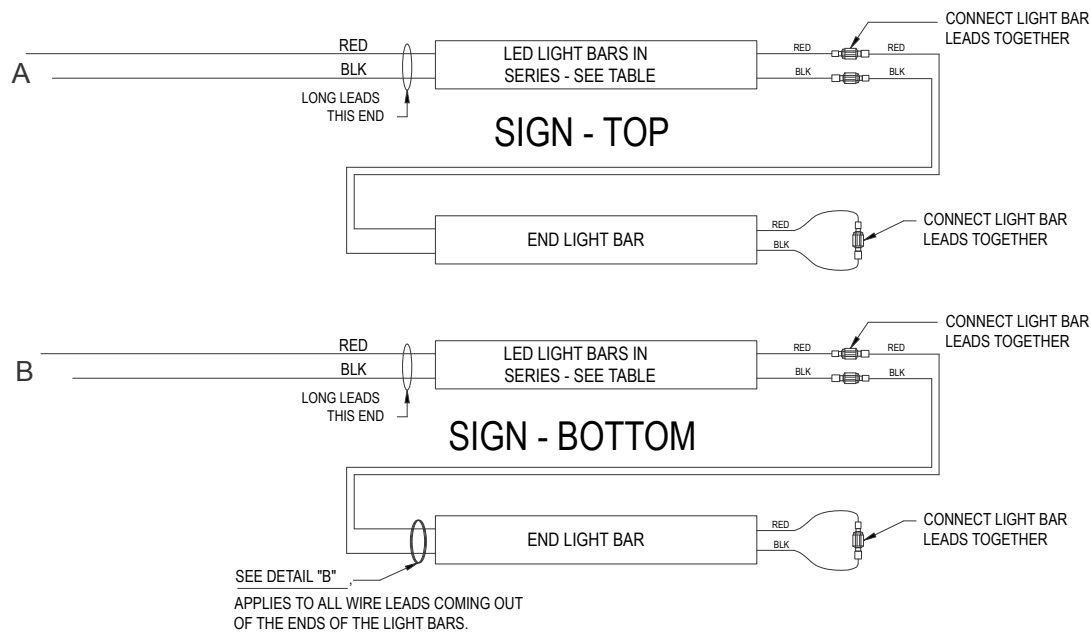


Table 7: Dual Power Supply: LED Light Bar and Termination Chart

Sign Length	48A0442/16	Light Bars 48A0442/24	48A0442/32	Sections	Light Bars Top	per Section Bottom	Termination
2500	4	4	-	2	(16) + (24)	(16) + (24)	Connect Leads
2700	4	4	-	2	(16) + (24)	(16) + (24)	Connect Leads
2900	4	-	4	2	(32) + (16)	(32) + (16)	Connect Leads
3300	-	-	6	3	(32)	(32)	Connect Leads
3700	4	4	2	3	See Figure 23	See Figure 23	Connect Leads

Figure 23: Detail A

16	24	32	16	24
16	24	32	16	24

7.0 ICAO Light Bar Sign Parts

Ordering Code

SXXX - X X X 6 X X 0

Type

B = ICAO/TP 312 LED Light Bar

Sign Height¹

6 = 600 mm standard height

8 = 800 mm standard height

D = 600 mm 48" (1219 mm) OAH^{2,3}

E = 600 mm 60" (1524 mm) OAH^{2,3}

F = 600 mm 72" (1829 mm) OAH^{2,3}

G = 800 mm 48" (1219 mm) OAH²

H = 800 mm 60" (1524 mm) OAH²

J = 800 mm 72" (1829 mm) OAH²

Illuminated Face Length

A = 700 mm

B = 900 mm

C = 1100 mm

D = 1300 mm

E = 1500 mm

F = 1700 mm

G = 1900 mm

H = 2100 mm

J = 2300 mm

K = 2500 mm

L = 2700 mm

M = 2900 mm

N = 3300 mm

P = 3700 mm

Illumination

7 = Constant illumination from 2.8 to 6.6 A⁵

Face

1 = Single

2 = Double

Wind Rating

S = Standard (320 km/h, 200 mph)

6

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

4 = Power through side with ON/OFF switch

5 = Customer-provided entry without ON/OFF switch⁶

6 = Customer-provided entry with ON/OFF switch⁶

7 = Power through bottom without ON/OFF switch

8 = Power through bottom with ON/OFF switch

Tether

0 = No tether

1 = One tether on one end of sign⁴

2 = Two tethers, one on each end⁴

3 = One tether per leg⁴

0

Ordering Code Notes

- Left/right designation determined when viewing secondary side of the sign
- Customer to provide legend information and power connection side. It is important to match power cord exit location with legend side.
- All signs are provided with an internal inspection window on the end of the sign.

¹ Standard character height for 600 mm sign is 300 mm. Standard character height for 800 mm sign is 400 mm. Customer to advise if different character height is needed.

² TP 312 standard configuration.

³ Tether ordered separately. See 600 mm Tether Kit information.

⁴ Option not available on all 48", 60" and 72" signs. For Canadian 600 mm applications, use Tether Kit 970724 -XX (ordered separately).

⁵ Operates on 3-step and 5-step circuits.

⁶ Cord set coiled up inside. Customer provides entry hole.

Legend Panel Replacement
Ordering Code

Visible Face Height

6 = 600 mm
8 = 800 mm

Visible Panel Width

07 = 700 mm
09 = 900 mm
11 = 1100 mm
13 = 1300 mm
15 = 1500 mm
17 = 1700 mm
19 = 1900 mm
21 = 2100 mm
23 = 2300 mm
25 = 2500 mm
27 = 2700 mm
29 = 2900 mm
33 = 3300 mm
37 = 3700 mm

Panel Type

1 = With legend
2 = Black (blank)

Wind Rating

0 = Standard

0

Note:

Customer to specify character height and legend information.

44A7433 - X X X X X 0

LED Light Engine Tester

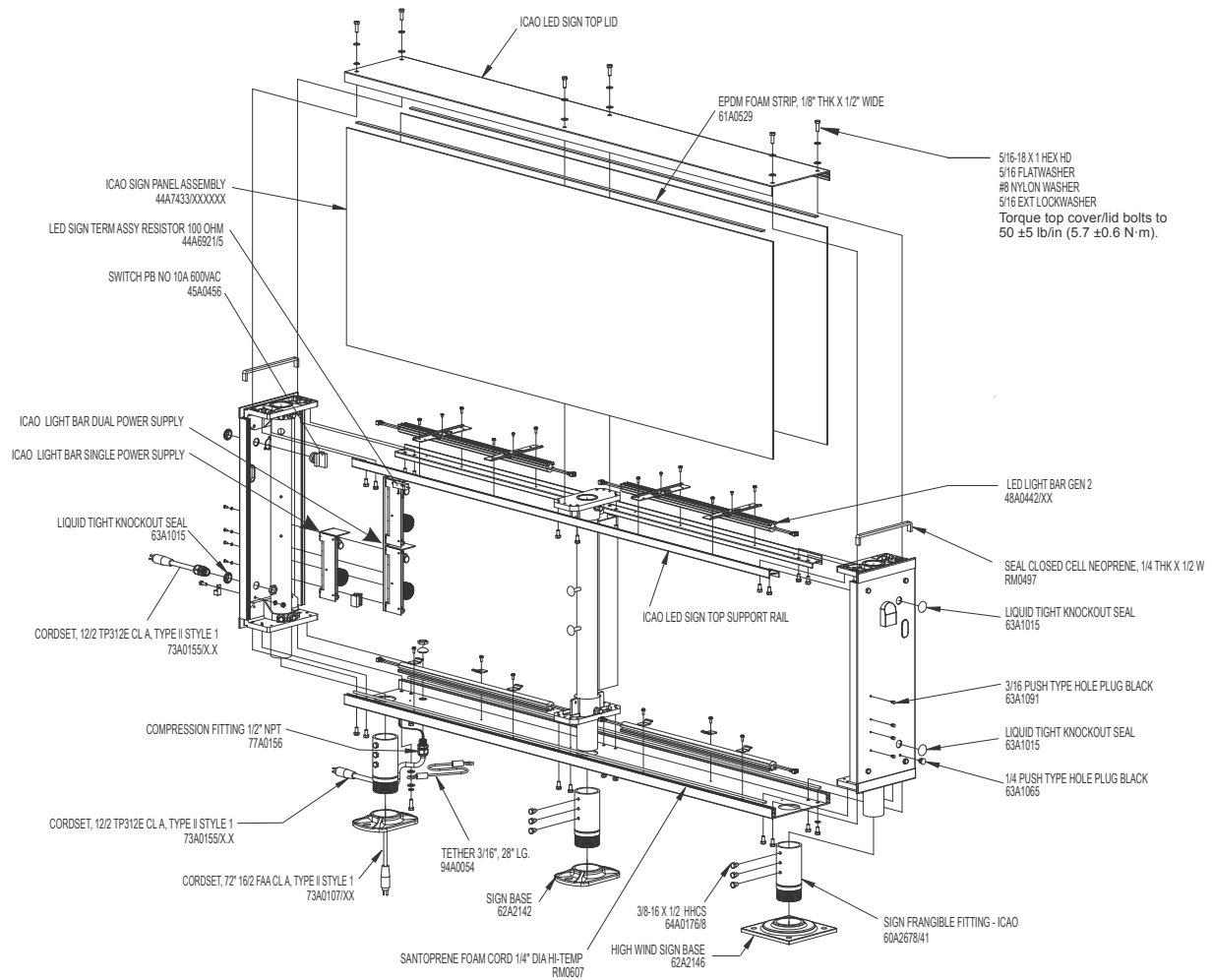
44A7264-1

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.

Note: Tester can also be used on all ADB Safegate SB-type LED signs.

7.1 Parts Diagrams

Figure 24: ICAO LED Sign Assembly Parts



Note

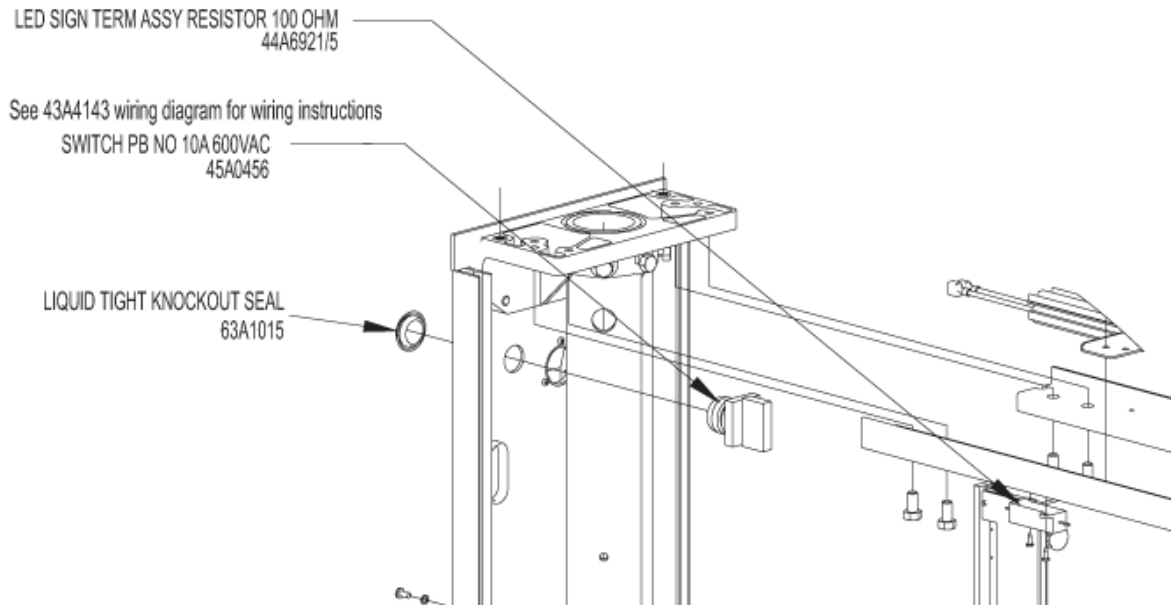
TORQUE ALL:

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

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

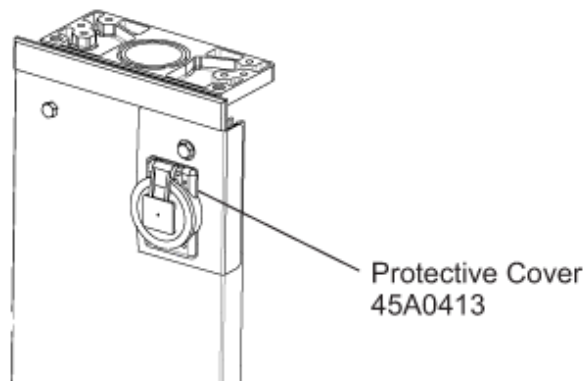
3/8-16 bolts to 200 ± 10 inch-pounds (22.6 ± 1 N·m)

Figure 25: Switch and Resistor Close-up detail



Order kit 94A0649/ICAONB for a factory installed cover for the ON/OFF switch. The cover protects from inadvertent operation of the button associated with heavy snow being piled or blown against the sign.

Figure 26: ON/OFF Switch Protective Cover



7.2 Spare Parts

Create a sufficiently large stock of spare parts to maintain the ICAO/TP312 LED Signs in the field. Consider acquiring approximately 10% of critical spare final assemblies (with a minimum quantity of one) for the total amount of equipment in the field. This allows for repairs to be made in the shop.

For the ICAO/TP312 LED Sign, see the tables below for spares.

- Consider acquiring 10% spares for critical components noted as (A) in the table below.

If only a small number of LED SIGN units are installed, consider acquiring at least one of each of the components noted as (A) below.

- For large installations also consider acquiring 1% spares for parts noted as (B) in the table below. If it is important to have a robust level of spare parts on-hand, and only a small number of LED Signs are installed, consider acquiring one of each of the components noted as (B) below.

Table 8: ICAO/TP312 LED Sign Spare Parts

Part Number	Description	Location	Notes	Spares
73A0107-XX	Cord set, L-823 (power through leg)	Figure 24	If Used	B
73A0155-X.X	Cord set, TP 312E, 12/2 SO cord, 2.5 m (other sign exit locations)	Figure 24	If Used	B
62A2142	Floor flange (2-bolt)	Figure 24		B
62A2146	Floor flange (4-bolt) ²	Figure 24		B
48A0442-16	LED Light Bar, 16"	Figure 24		A
48A0442-24	LED Light Bar, 24"	Figure 24		A
48A0442-32	LED Light Bar, 32"	Figure 24		A
94A0054	Tether	Figure 24		B
60A2678/XX	Sign Frangible Coupling - ICAO 600 mm Sign, Standard ²	Figure 11 and Figure 24	see Table 9 and Table 10	B
60AXXX/XX	Sign Frangible Coupling - ICAO 800 mm Sign, Standard ^{2, 3, 4}	Figure 11	see Table 11 and Table 12	B
44A7417/10	Dual Power Supply Assembly	Figure 24		A
44A7260/010	Single Power Supply Assembly ^{5, 6, 7}	Figure 24		A
44A6921/5	LED Sign Terminal Assembly Resistor 100 Ohm	Figure 25		B
45A0456	Switch Push Button, NO, 10 A, 600 VAC	Figure 25	If Used	B
RM0607	Foam Cord 1/4" Dia HI-Temp	Figure 24	Used in bottom sign panel channel; ordered by foot	B
61A0529	EPDM Foam Strip, 1/8 in Thick x 1/2 in Wide (top faces above sign panel)	Figure 24	ordered by foot	B
60A4323/XXX	Leg Extension	Figure 27		B
44A6921/5	Resistor assembly			B
44A7264-1	Light Bar Tester			B

Notes

¹ This installation drawing 117A0069 is available on the ADB Safegate website or you can request a copy from your sales representative.

² Refer to Table 9 through Table 12 for which floor flange is needed.

³ Refer to drawing 117A0069, ICAO & TP312 installation detail, for frangible coupling and foot option specification.

⁴ Apply 67A0105 LOCTITE anti-seize to all frangible coupling threads.

⁵ 44A7260/010 single driver used on illuminated face length options "A" through "K"

⁶ 44A7417/10 dual power supply assembly used on illuminated face length options "L" through "P"

⁷ See Figure 16 and Figure 17 for configuration instruction

⁸ RM0607 gaskets are cut to length and placed inside the channels along each side of the bottom panels

⁹ 61A0529 gaskets are cut to length and affixed with the adhesive side along both inside corners of the sign top lid

Table 9: 600 mm Face - Standard Height Sign Coupling

Size Modules	Illuminated Face Length	Frangible Coupling	Mounting Flange
SBXA/, SIXA/	700 mm	60A2678/10	62A2142
SBXB/, SIXB/	900 mm	60A2678/10	62A2142
SBXC/, SIXC/	1100 mm	60A2678/60	62A2142
SBXD/, SIXD/	1300 mm	60A2678/60	62A2142
SBXE/, SIXE/	1500 mm	60A2678/20	62A2142
SBXF/, SIXF/	1700 mm	60A2678/60	62A2142
SBXG/, SIXG/	1900 mm	60A2678/20	62A2142
SBXH/, SIXH/	2100 mm	60A2678/20	62A2142
SBXJ/, SIXJ/	2300 mm	60A2678/30	62A2142
SBXK/, SIXK/	2500 mm	60A2678/30	62A2142
SBXL/, SIXL/	2700 mm	60A2678/30	62A2142
SBXM/, SIXM/	2900 mm	60A2678/30	62A2142
SBXN/, SIXN/	3300 mm	60A2678/30	62A2142
SBXP/, SIXP/	3700 mm	60A2678/40	62A2142

Table 10: 600 mm FACE – 48"; 60"; 72" HEIGHT SIGN Coupling

Size Modules	Illuminated Face Length	Frangible Coupling	Mounting Flange
SBXA/, SIXA/	700 mm	60A2678/60	62A2142
SBXB/, SIXB/	900 mm	60A2678/20	62A2142
SBXC/, SIXC/	1100 mm	60A2678/30	62A2142
SBXD/, SIXD/	1300 mm	60A2678/40	62A2142
SBXE/, SIXE/	1500 mm	60A2678/40	62A2142
SBXF/, SIXF/	1700 mm	60A2678/40	62A2142
SBXG/, SIXG/	1900 mm	60A2678/21	62A2146
SBXH/, SIXH/	2100 mm	60A2678/21	62A2146
SBXJ/, SIXJ/	2300 mm	60A2678/50	62A2146
SBXK/, SIXK/	2500 mm	60A2678/50	62A2146
SBXL/, SIXL/	2700 mm	60A2678/41	62A2146
SBXM/, SIXM/	2900 mm	60A2678/41	62A2146
SBXN/, SIXN/	3300 mm	60A2678/41	62A2146
SBXP/, SIXP/	3700 mm	60A2678/41	62A2146

Table 11: 800 mm Face - Standard Height Sign Couplings

Size Modules	Illuminated Face Length	Frangible Coupling	Mounting Flange
SBXA/, SIXA/	700 mm	60A2678/60	62A2142
SBXB/, SIXB/	900 mm	60A2678/20	62A2142
SBXC/, SIXC/	1100 mm	60A2678/20	62A2142
SBXD/, SIXD/	1300 mm	60A2678/30	62A2142
SBXE/, SIXE/	1500 mm	60A2678/40	62A2142

Table 11: 800 mm Face - Standard Height Sign Couplings (Continued)

Size Modules	Illuminated Face Length	Frangible Coupling	Mounting Flange
SBXF/, SIXF/	1700 mm	60A2678/30	62A2142
SBXG/, SIXG/	1900 mm	60A2678/40	62A2142
SBXH/, SIXH/	2100 mm	60A2678/21	62A2146
SBXJ/, SIXJ/	2300 mm	60A2678/21	62A2146
SBXK/, SIXK/	2500 mm	60A2678/50	62A2146
SBXL/, SIXL/	2700 mm	60A2678/50	62A2146
SBXM/, SIXM/	2900 mm	60A2678/50	62A2146
SBXN/, SIXN/	3300 mm	60A2678/50	62A2146
SBXP/, SIXP/	3700 mm	60A2678/50	62A2146

Table 12: 800 mm Face - 48"; 60"; 72" Height Sign Couplings

Size Modules	Illuminated Face Length	Frangible Coupling	Mounting Flange
SBXA/, SIXA/	700 mm	60A2678/20	62A2142
SBXB/, SIXB/	900 mm	60A2678/30	62A2142
SBXC/, SIXC/	1100 mm	60A2678/30	62A2142
SBXD/, SIXD/	1300 mm	60A2678/40	62A2142
SBXE/, SIXE/	1500 mm	60A2678/21	62A2146
SBXF/, SIXF/	1700 mm	60A2678/21	62A2146
SBXG/, SIXG/	1900 mm	60A2678/50	62A2146
SBXH/, SIXH/	2100 mm	60A2678/50	62A2146
SBXJ/, SIXJ/	2300 mm	60A2678/41	62A2146
SBXK/, SIXK/	2500 mm	60A2678/41	62A2146
SBXL/, SIXL/	2700 mm	60A2678/41	62A2146
SBXM/, SIXM/	2900 mm	60A2678/41	62A2146
SBXN/, SIXN/	3300 mm	60A2678/41	62A2146
SBXP/, SIXP/	3700 mm	60A2678/41	62A2146

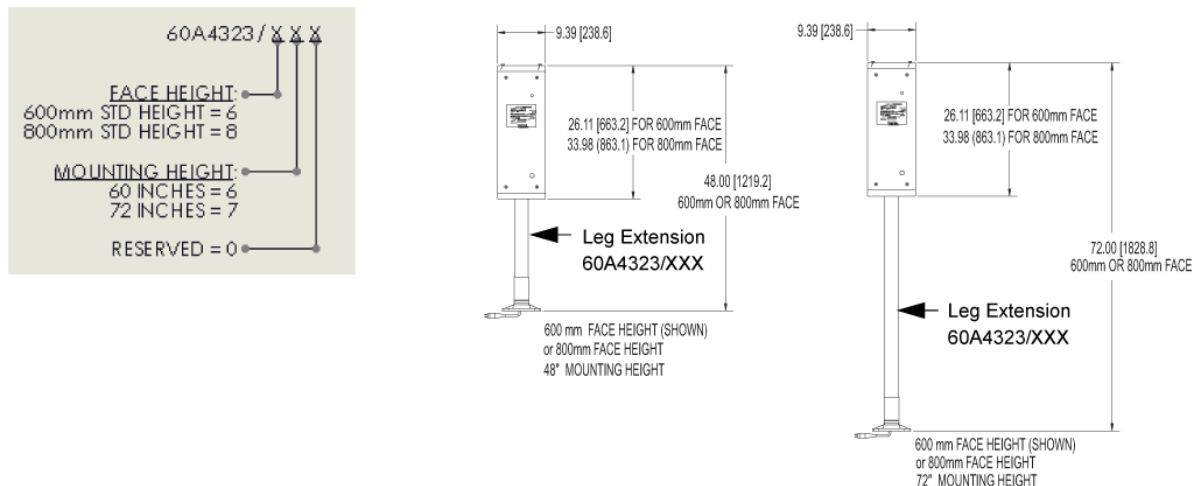
Figure 27: Leg Extensions


Table 13: Cordset Usage

DIGIT 3 - HEIGHT		DIGIT 9 - POWER	
6, 8, D, E, F, G, H, J	Sign Height	1, 2 THRU LEG	3, 4, 5, 6, 7, 8 SIDE, BOTTOM, CUSTOMER PROVIDED
SB6X	600 mm Standard	73A0107/72	73A0155/1.5
SB8X	800 mm Standard	73A0107/72	73A0155/1.5
SBDX	600 mm 48" (1219 mm) OAH	73A0107/72	73A0155/1.5
SBEX	600 mm 60" (1524 mm) OAH	73A0107/98	73A0155/2.5
SBFX	600 mm 72" (1829 mm) OAH	73A0107/98	73A0155/2.5
SBGX	800 mm 48" (1219 mm) OAH	73A0107/98	73A0155/2.5
SBHX	800 mm 60" (1524 mm) OAH	73A0107/98	73A0155/2.5
SBJX	800 mm 72" (1829 mm) OAH	73A0107/98	73A0155/2.5

Table 14: Cordsets

CORD	DESCRIPTION	CONDUCTORS	JACKET DIA.
73A0107/72	L-823 C.SET FAA CLASS A TY II ST1, 72"L	16/2	0.38 in
73A0107/98	CORDSET 98" 16/2 SOW 600V ST 1 STRIPPED	16/2	0.38 in
73A0155/1.5	CORDSET 1.5 M (59") 12/2 SOW 600V ST 1	12/2	0.50 in
73A0155/2.5	CORDSET 2.5 M (98") 12/2 SOW 600V ST 1	12/2	0.50 in

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

Live Technical Support - Americas

If at any time you have a question or concern about your product, just contact ADB SAFEGATE's technical service department. 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.

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

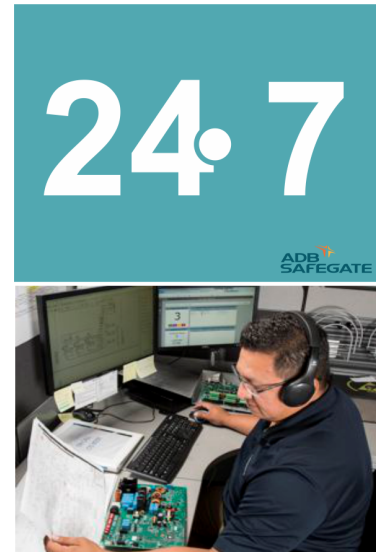
ADB SAFEGATE Americas Technical Service & Support (International): +1-614-861-1304

During regular business hours, you can also Chat with a Service Technician. We look forward to working with you!

Before You Call

When you have an airfield lighting or system control system problem it is our goal to support airfield maintenance staff as quickly as possible. To support this effort we ask that you have the following information ready before calling.

- The *airport code*
- If not with an airport, then company name (prefer customer id number)
- Contact phone number and email address
- Product with part number preferable or product number
- Have you reviewed the product's manual and troubleshooting guide
- Do you have a *True RMS* meter available (and any other necessary tools)
- Be located with the product ready to troubleshoot



Note

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

Brussels: +32 2 722 17 11

Rest of Europe: +46 (0) 40 699 17 40

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

China: +86 (10) 8476 0106

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 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 *ROHS/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.

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