

# APPROACH LIGHTING

## ALSF

High-Intensity Approach Lighting System with elevated sequenced flashers



### Compliance with Standards

- FAA:** Designed according to ALSF-1, ALSF-2, ALSF-2/SSALR FAA-E-2628; FAA-E-2325 (Sequenced Flashing Components)
- ICAO:** Annex 14 para. 5.3.4.7, 5.3.4.15, 5.3.4.16, 5.3.4.30, and 5.3.4.31
- Military:** AFMAN(I) 32-1187/TM 811-5 (UFC 3-535-01) Approach Applications

### Uses

ALSF-1, ALSF-2, and ALSF-2/SSALR approach lighting systems with elevated sequenced flashing lights are used at airports and military air bases to provide landing approach guidance, such as runway alignment, height perception, horizontal reference, and roll guidance extending from the landing threshold outward (2,400-3,000 feet) into the approach zone.

#### ALSF-1

- The ALSF-1 approach lighting system is used on Category I Instrument Landing Systems (ILS) and includes up to 24 light stations (100-foot spacing) with up to 22 centerline bars of steady-burning lights (five lights to a bar) and up to 15 flashers.

#### ALSF-2

- The ALSF-2 approach lighting system is used on Category II runways and includes up to 30 light stations (100-foot spacing) with 30 centerline bars of steady-burning lights (five lights to a bar) and up to 21 flashers.

#### SSALR

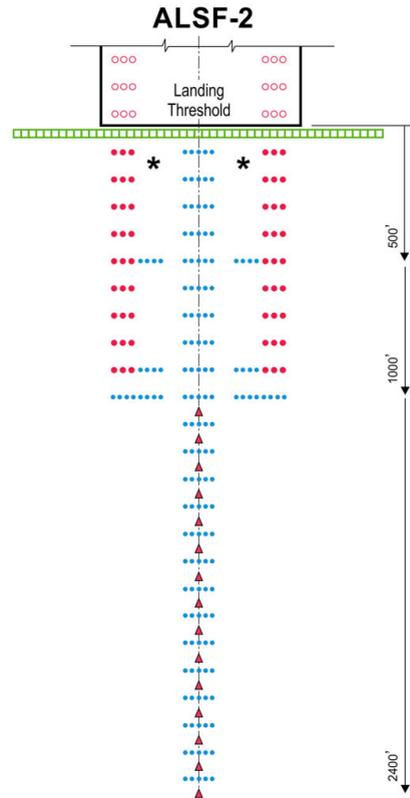
- The SSALR approach lighting system has up to eight sequenced flashing lights and is used as part of a dual-mode approach lighting system (ALSF-2/SSALR) when Category I conditions exist on Category II designated runways.

### Operating Conditions

- Temperature** -67 °C to +137 °C (-55 °F to +55 °F)
- Humidity** 0 to 100%
- Altitude** 0 to 10,000 ft (3048 m) maximum

### Theory of Operation

ADB Safegate's sequenced-flasher lighting systems include a master control unit, junction boxes, individual control cabinets (ICC), and elevated flasher units. In the ALSF configuration, an array of light bars are installed symmetrically around the centerline of the approach lighting system, starting at the approach threshold and extending a total distance of 2,400 feet (731.5 m) outward into the approach zone up to 3,000 feet (914 m) at facilities where high-speed military aircraft share runway usage. Up to 21 flashing lamp assemblies are installed in the outer portion of the approach lighting system at regular intervals. Flashing lights are arranged and connected in such a way as to produce a sequenced flashing light signal that has the appearance of a ball of light traveling down the system from the outer end (flasher farthest from the runway threshold) to the flasher assembly closest to the runway threshold.



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### ALSF Master Control Cabinet

The master control cabinet contains control circuitry and monitoring PCBs, which provide the power, timing signals, misfire monitoring circuitry, and three-step intensity control signals to the sequenced flasher assemblies in remote (120 VAC or +48 VDC control) and local mode. The master cabinet can control up to 21 sequenced flasher assemblies, providing power and trigger signals to produce a sequenced flashing light signal having the appearance of a ball of light traveling down the approach zone.



### Equipment Data

<b>Input and Output Voltage</b>	120/240 VAC, +10%, 60 Hz, three-wire, Voltage single-phase (neutral center-tapped). Optional input: 480 VAC, +10%, 60 Hz, two-wire, single-phase.
<b>Output Trigger Pulses</b>	Time-synchronized with the 60 Hz line
<b>Time from Trigger Pulse to Trigger Pulse</b>	In ALSF mode, corresponds to one cycle of 60 Hz line, 16.67 ms. In SSALR mode, corresponds to every other cycle of the 60 Hz line or 33.3 ms.
<b>Modes of Operation</b>	Manual (local) control and remote control (+48 VDC or 120 VAC)
<b>Enclosure</b>	NEMA 4, outdoor and ventilated (to prevent condensation)
<b>Maintenance Features on Control Cabinet</b>	<ul style="list-style-type: none"> <li>Rotary control switch for manual control of brightness level of system</li> <li>Flasher ON/OFF switch to de-energize flashers (if desired) when the approach lights are energized</li> <li>LED indicators on control panel for system monitoring</li> <li>Service entrance switch disconnects incoming power to the control unit</li> <li>100 W maintenance light</li> <li>Door can be locked in a 120° open position</li> </ul>
<b>Lightning Protection</b>	Rugged surge protection on all input and output electrical connections

### Master Control Cabinet

44D1650 / □ □ □

#### Flashers

- 1 = 8 flashers (maximum)
- 2 = 15 flashers (maximum)
- 3 = 21 flashers (maximum)

#### Monitoring

- 1 = Without monitoring
- 2 = With Monitoring (standard)

#### Voltage

- 1 = 120/240 VAC (standard)
- 2 = 480 VAC

#### Enclosure Type

- 1 = Standard
- 2 = Stainless steel



### Input Power Requirement

Voltage	Maximum Number of Flashers	Maximum Power Requirements
120/240 VAC	3	4 kVA
	6	5 kVA
	9	6 kVA
	12	7 kVA
	15	8 kVA
	18	9 kVA
480 VAC	21	10 kVA
	12	7.5 kVA
	21	11 kVA

### Packaging Information

	Dimensions	Gross Weight
<b>120/240 VAC (standard)</b>	37.25 x 30 x 11.38 in 94.6 x 76.2 x 28.9 cm	137 lb 62 kg
<b>480 VAC</b>	48 x 36 x 16.38 in 125.1 x 91.4 x 41.6 cm	279 lb 126.6 kg

## Individual Control Cabinet (ICC)

Each flasher unit is controlled by an individual control cabinet, which houses triggering circuits, terminal blocks, and lightning arrestors. A safety interlock switch is incorporated into the enclosure to discharge the high-voltage circuitry when the cabinet door is opened.



## Individual Control Cabinet (ICC)

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### Flasher Type

- 1 = Elevated Flasher
- 3 = Elevated Flasher Panel Only
- 5 = Elevated Flasher (Stainless Steel)

## Equipment Data

<b>Quantity</b>	One for each flash unit
<b>Enclosure</b>	Outdoor, door handle can be padlocked
<b>Input Voltage</b>	120/240 VAC, 60 Hz, three-wire, (neutral center-tapped). Voltage range for operation is 185-260 VAC.
<b>Input Current</b>	1 A in high intensity (average)
<b>Flash Lamp Output Voltage</b>	+2,000 VDC
<b>Maximum Power Consumption</b>	250 W or less
<b>Intensity Step Change Component Life</b>	150,000 operations minimum
<b>Protection</b>	Rugged surge protection on all external wiring connections
<b>Mounting</b>	Two 2-inch (5.08 cm) threaded fittings are provided on bottom of cabinet for mounting. Mounting lugs are also provided on the back of the cabinet.
<b>Installation Distance</b>	ICC can be installed a maximum of 2,400 ft (370 m) from master control cabinet. Contact ADB for distances over 2,400 ft.
<b>Dimensions</b>	20 x 16 x 8 in (50.8 x 40.64 x 20.3 cm)
<b>Weight</b>	57 lb (25.85 kg)

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### Elevated Flasher

Each elevated flash head assembly consists of a flashing light head, which houses a PAR-56 flashtube and a trigger transformer. A safety interlock switch is incorporated in the flash head. It works in conjunction with the individual control cabinet (ICC) interlock switch to discharge the voltage across the flash lamp when either the ICC door is opened or the flash-tube is removed.



### Elevated Flasher

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#### Slip Fit

- 1 = Slip fitting for 2-inch EMT, 1.5-inch tube and tower
- 2 = Slip fitting for 1.5-inch Schedule 40 pipe and 62B0064 frangible coupling only



**Note:** 120 W, 2000 VAC, PAR-56 Xenon lamp included. For replacement lamps, use part number 48B0022.

### Equipment Data

<b>Input Voltage</b>	+2,000 VDC
<b>Lamp</b>	PAR-56 xenon flashtube
<b>Lamp Life</b>	Average 1,000 hours on high-intensity step
<b>Intensity Decrease</b>	30% or less over minimum rated lamp life
<b>Flash Duration</b>	40-100 microseconds
<b>Flash Skipping</b>	Less than 1% with no consecutive skipping
<b>Light Beam Axis</b>	Adjustable vertically from the horizontal to 25° above the horizontal
<b>Vibration</b>	Withstands vibration in frequency range of 10 to 2,000 Hz in accordance with NEMA Standard FA1-3.01
<b>Enclosure</b>	Rain tight
<b>Mounting</b>	On a 2-in (5.08 cm) frangible coupling or 2-in EMT conduit, or 1.5-inch (3.81 cm) OD tube or 1.5-inch schedule 40 pipe. Mounting can be on a 1-in (2.54 cm) pipe (used on an aluminum tower) using adapter sleeve.
<b>Installation Distance</b>	A maximum of 60 ft (18.3 m) from ICC
<b>Dimensions</b>	13.33 x 6.25 x 8.31 in (33.86 x 15.88 x 21.11 cm)
<b>Weight</b>	4 lb (1.8 kg)

### Elevated Flasher Photometric Data

Intensity Setting	Flashtube Intensity	
	Max. Effective Intensity	Min. Effective Intensity
High	20,000 cd	8,000 cd
Medium	2,000 cd	800 cd
Low	450 cd	150 cd

### In-pavement Flasher

In-pavement flashers are not available with this system. If in-pavement flashers are required, see DST-2091.

## Junction Box

Junction boxes are used to distribute power and control signals to the ICCs. One junction box is required for each sequenced flasher in the system. Each junction box has two terminal strips to accommodate the incoming and outgoing power, control circuit, and monitoring wire for the flasher unit.



**Steel Junction Box (Standard)**

**44D1653**

**Stainless Steel Junction Box**

**44D1653/1**

## Equipment Data

<b>Quantity</b>	One for each flasher unit
<b>Conduit Hub</b>	Two 2-inch hubs in the bottom of the box
<b>Dimensions</b>	14 x 14 x 6 in (35.56 x 35.56 x 15.24 cm)
<b>Weight</b>	15 lb (6.8 kg)

## PAR-56 Lamp Holder

Eighteen PAR-56 lamp holders are installed on the runway threshold. The lamp holder has mounting clips to hold the green filter and is designed to accommodate a 300 W, 120 VAC PAR-56 lamp. Each lamp holder has an adjustable base for vertical adjustment and mounts to a 2-inch EMT conduit or on top of a frangible coupling.



**Note:** Steady-burning portion of ALSF system is ordered separately. See ADB Safegate PAR-56 data sheet 1042 for more details.

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### Aiming Device

The aiming device is used to adjust and measure the vertical elevation angle of PAR-38 and PAR-56 steady burning or flashing lamp holders. The aiming device permits aiming of the lamp axis perpendicular to the plane of the cover glass at any angle from 0° to +25° above the horizontal, even when mounted on low impact-resistant structures conforming to FAA-E-2604 or FAA-E-2702. The aiming angle is indicated on a scale calibrated in 1° intervals, and the actual aiming angle of the lamp holder with the aiming device attached is accurate to within ±0.5°.



For PAR-56 Lamp Only  
For PAR-56 and PAR-38 Lamps

44D1654/1  
44D1654/2

### Equipment Data

Quantity	One
Aiming	Flash lamp axis can be aimed from 0° to 25° above the horizontal
Scale	Calibrated in 1° increments
Accuracy	±0.5°
Dimensions	7 dia. x 10 H in (17.78 dia. x 25.4 H cm)

### Flasher Tester

The portable flasher tester is equipped with a test cable and plug, which connect to a socket in the ICC to monitor the operation of the flasher light unit. The flasher tester is capable of testing the power circuits and control signals from the master control unit to the ICC, and from the ICC to the flash head.



Flasher Tester

44D1686/1

### Equipment Data

Contains	Voltmeter, pulse detector, test-signal switch, and intensity- and trigger-control switches
Test Cable	Plugs into socket in the ICC
Dimensions	9 x 17 x 10 in (22.9 x 43.2 x 25.4 cm)
Weight	3.5 lb (1.59 kg)

### Spare Parts Trunk

Spare Parts Trunk includes I/O interface, Control PCB, ICC Flasher PCB, Bleeder, and Monitoring PCBs.



### Spare Parts Trunk

#### Monitoring

- 1 = Flasher With Monitoring (Standard)
- 2 = Flasher Without Monitoring

#### Frequency

- 1 = 60 Hz

#### Flashers

- 1 = 8 Flashers (Maximum) System
- 2 = 15 Flashers (Maximum) System
- 3 = 21 Flashers (Maximum) System

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#### Note:

- The spare parts trunk must be ordered separately for FAA-E-2628 applications
- Sequenced flashing components (Part No. 44A1788) are ETL Certified according to FAA-E-2325

### High-Voltage Wire

12AWG Wire 3kV 105C White

89A0110/1

### Ordering Information

The above equipment is supplied for the ALSF-1, ALSF-2, and ALSF-2/SSALR approach lighting systems per FAA-E-2628.

Quantity	Description
1	Master Control Cabinet
Up to 21	Flashing Light Heads
Up to 21	Individual Control Cabinets
Up to 21	Junction Boxes
1	Aiming Device
1	Flasher Tester
1	Instruction Manual

**Note:** Additional equipment may be required, but must be ordered separately:

- PAR-56 Lamp Holder Assemblies
- PAR-56 Lamps
- Frangible Couplings
- Low Impact-Resistant Structures
- High-Voltage Interconnection Wire
- Spare Parts Trunk
- L-830 Isolation Transformer
- 1,500 W, 20 A/20 A, Isolation Transformer
- For in-pavement FAA-E-2952 (Replacement for 2491) ALSF high intensity system applications, see data sheet 2029 for details.