

# APPROACH LIGHTING

## MALSR

### Medium-Intensity Approach Lighting System

With elevated sequenced flashers and steady burning lights



#### Compliance with Standards

**FAA** Designed according to MALSR FAA-E-2325

#### Uses

The MALSR approach lighting system 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 feet) into the approach zone.

#### MALSR

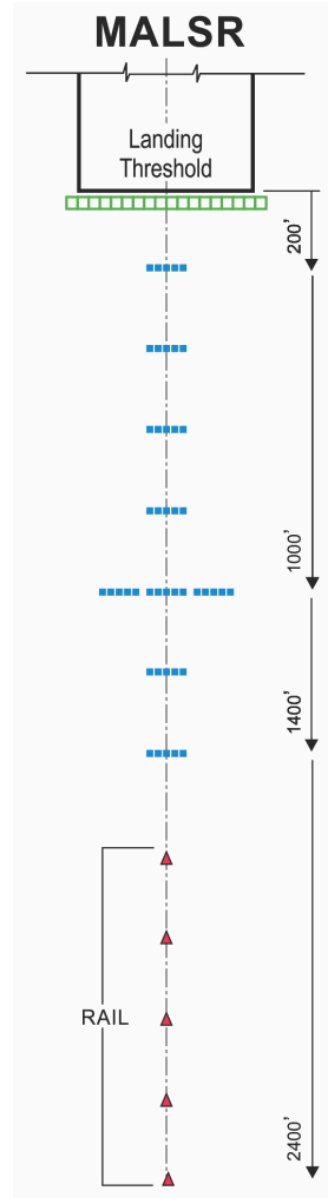
- The MALSR approach lighting system is used on Category I Instrument Landing Systems (ILS) and includes up to 12 light stations (200-foot spacing) with up to 7 centerline bars of steady-burning lights (five lights to a bar) and up to 8 flashers.

#### Operating Conditions

- Temperature Range** -67 °F to +158 °F (-55 °C to +70 °C)
- Humidity** 0 to 100%, condensing
- Altitude** 0 to 10,000 feet (3,048 m) maximum

#### Theory of Operation

ADB Safegate's sequenced-flasher lighting system includes a master control unit, junction boxes, individual control cabinets, a 15 kVA steady-burning light transformer, and elevated flasher units. In the MALSR 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) into the approach zone and up to 3,000 feet (914.4 m) at facilities where high-speed military aircraft share runway usage. Up to 11 flashing lamp assemblies are installed in the outer portion of the approach lighting system at regular intervals. Flashing lights are arranged and connected 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.



# MALSR

## MALSR 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.



## MALSR Master Control Cabinet

Flashers  
Monitoring

44D1655/   1 1

### Flashers

- 1 = 5 flashers (maximum)
- 2 = 8 flashers (maximum)
- 3 = 11 flashers (maximum)

### Monitoring

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

## 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

## Equipment Data

<b>Input and Output Voltage</b>	120/240 VAC, $\pm 10\%$ , 60 Hz, three-wire, single-phase (neutral center-tapped)
<b>Output Trigger Pulses</b>	Time-synchronized with the 60 Hz line
<b>Time from Trigger Pulse to Trigger Pulse</b>	33.3 milliseconds
<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>Dimensions</b>	37.25 × 30 × 11.38 in 94.6 × 76.2 × 28.9 cm
<b>Weight</b>	137 lb (62 kg)

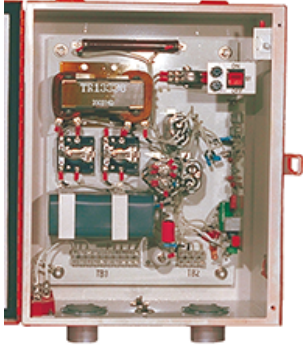
## Input Power Requirements

Max. No. of Flashers	Max. Power Requirements
3	18 kVA
5	19 kVA
8	20 kVA

# MALSR

## Individual Control Cabinet (ICC)

Each flasher unit is controlled by an individual control cabinet, which houses triggering circuits, terminal blocks, and lightning arresters. 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)

Flasher Type

**44D1651/**

### 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)
<b>Input Current</b>	1 A in high intensity (average)
<b>Maximum Power Consumption</b>	250 W or less
<b>Intensity Step Change Component Life</b>	150,000 operations minimum
<b>Protection</b>	All components are protected from high-voltage transients
<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 back of the cabinet.
<b>Installation Distance</b>	ICC can be installed a maximum of 3,000 ft (914.4 m) from master control cabinet
<b>Dimensions</b>	20 × 16 × 8 in (50.8 × 40.64 × 20.3 cm)
<b>Weight</b>	57 lb (25.85 kg)

# MALSR

## 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 flashtube is removed.



## Elevated Flasher

Slip Fit

44D1677/□

### 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:** Flash head includes lamp. For replacement lamp use part number 48B0022.

## Equipment Data

<b>Input Voltage</b>	+2,000 VDC
<b>Lamp</b>	PAR-56 xenon flash tube
<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>	0-100 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-inch (5.08 cm) frangible coupling or 2-inch EMT conduit, or 1.5-inch (3.81 cm) OD tube or 1.5-inch schedule 40 pipe. Mounting can be on a 1-inch (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 × 6.25 × 8.31 in (33.86 × 15.88 × 21.11 cm)
<b>Weight</b>	4 lb (1.8 kg)

## Elevated Flasher Photometric Data

Intensity Setting	Flash Tube 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.



**Standard Steel Junction Box**

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 × 14 × 6 in (35.56 × 35.56 × 15.24 cm)
<b>Weight</b>	15 lb (6.8 kg)

## 15 kVA Power Transformer

The 15 kVA, 60 Hz power transformer powers the steady-burning PAR-56 and PAR-38 lights. Taps on the transformer are switched by contactors in the master control cabinet to provide power at any one of three voltage levels to the steady-burning lights. Taps provided on the primary of the transformer permit secondary voltage adjustment to within 2.5% of the required secondary output assuming the primary voltage is between 210 V and 252 VAC. The transformer is housed in an outdoor, rain-tight enclosure with lugs provided on the back of the enclosure for mounting the cabinet in a vertical position. Two external lightning arresters are provided for input and output lightning protection.



**15kVA Transformer**

44D1685/1

## Equipment Data

<b>Quantity</b>	One	
<b>Rating</b>	15 kVA	
<b>Input</b>	210-252 VAC, 60 Hz	
<b>Taps</b>	Provided on primary to permit adjustment of secondary voltages	
<b>Output Voltage (240 VAC Primary Input)</b>	<u>Intensity Step</u>	<u>Secondary Output</u>
	Low	50/100 VAC ±0.5%
	Medium	75/150 VAC ±0.5%
	High	120/240 VAC ±0.5%
<b>Dimensions</b>	13.25 × 12 × 18 in (33.7 × 30.48 × 45.7 cm)	
<b>Weight</b>	262 lb (119 kg)	

# MALSR

## PAR-38 Lamp Holder

There are 45 PAR-38 lamp holders mounted five to a light bar in the runway approach. Each lamp holder is designed to accommodate 150 W, 120 VAC PAR-38 lamps. An adjustable base on the lamp holder permits vertical adjustment from the horizontal to 25° above the horizontal. Also, the mounting hardware permits horizontal alignment of the light beam axis to any horizontal angle within +1°. The lamp holder has a mounting base that mounts on the open top of a frangible coupling, on a light bar with an adapter sleeve, or to a 2-inch (EMT) conduit.



## 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:** PAR-56 lamp holders are ordered separately. See ADB Safegate PAR-56 data sheet 1042 for more details.

### PAR-38 Lamp Holder

AS00061-001-02

**Note:** 60 W, 120 VAC PAR-38 lamps are sold separately. Use part number EA00001-000-01.

### Equipment Data

<b>Quantity</b>	45 total
<b>Installation</b>	Five PAR-38 lamp holders are installed on a light bar (Nine light bars in system)
<b>Dimensions</b>	9 × 3 × 3 in (22.9 × 7.6 × 7.6 cm)

### Adapter Sleeve

An optional adapter sleeve is used to adapt the fiberglass LIR mast mountings to 2.36 in (60 mm) for the slip fitter attachment.



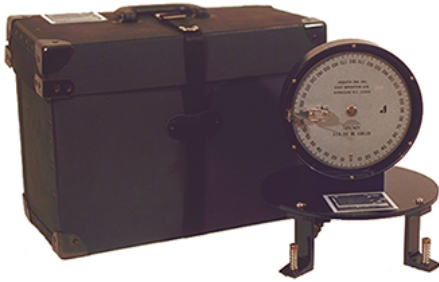
### Adapter Sleeve

4762

# MALSR

## 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

44D1654/1

For PAR-56 and PAR-38 Lamps

44D1654/2

## Equipment Data

<b>Quantity</b>	One
<b>Aiming</b>	Flash lamp axis can be aimed from 0° to 25° above the horizontal
<b>Scale</b>	Calibrated in 1° increments
<b>Accuracy</b>	±0.5°
<b>Dimensions</b>	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.



Flash Tester

44D1686/1

## Equipment Data

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

# MALSR

## Spare Parts Trunk

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



## Spare Parts Trunk

Monitoring  
Frequency  
Flashers

44D1652/

### 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

## High-Voltage Wire

Used to interconnect elevated flash head and individual control cabinet. Wire is supplied in 500-foot spools only. Please specify total length (in feet) of wire required when ordering.

**12AWG Wire 3kV 105C White**

89A0110/1

## Ordering Information

The following equipment is supplied for the MALSR approach lighting systems per FAA-E-2325:

Quantity	Description
1	Master Control Cabinet
3 to 11	Sequence Flasher Heads
3 to 11	Individual Control Cabinets
3 to 11	Junction Boxes
1	15 kVA Power Transformer
2	Lightning Arresters
45	PAR-38 Lamp Holders
18	PAR-56 Lamp Holders
1	Flasher Tester
A/R	High-Voltage Interconnecting Wire (flash head to ICC)
1	Aiming Device (PAR-38/-56)
1	Spare Parts Trunk
2	Instruction Manual

**Note:** Sequenced flashing components (Part No. 44A1788) are ETL Certified according to FAA-E-2325

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

- PAR-38, 150 W, 120 VAC spot lamps
- PAR-56, 300 W, 120 VAC spot lamps
- Frangible couplings
- Low impact-resistant structures
- For in-pavement FAA-E-2968 MALSR medium-intensity system, Style I, unidirectional white applications, use part number 44A6440-2000. This fixture uses one 105W lamp and is photometrically equivalent to the older style 200W L-850B fixtures that were used in this application. See data sheet 2029 for details.
- Encapsulated (FAA Style) isolation transformers are available for voltage-driven, medium-intensity approach lighting applications. For 105 W, 240 VAC to 15.9 VAC applications, use transformer use Part No. 35C0095.
- For in-pavement FAA-E-2968 MALSR medium-intensity system, Style II, unidirectional green applications, use part number 44A6440-1000. This fixture uses three 62 W lamps and is photometrically equivalent to the older style 200 W L-850E fixtures that were used in this application. See data sheet 2029 for details.