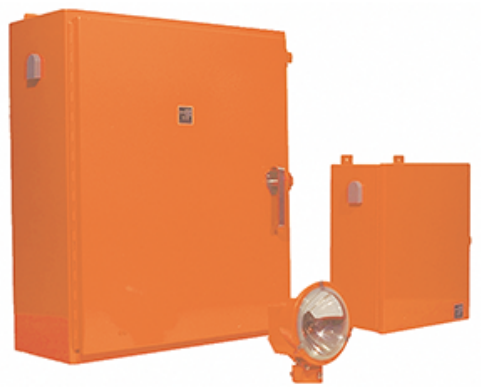
APPROACH LIGHTING

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 (2,400-3,000 feet) into the approach zone.

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.

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.

Table 1: Master Input Power Requirements

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

Master Control Cabinet

44D1655 - X X 1 1

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

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

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Table 2: MCC Equipment Data

Input and Output Voltage	120/240 VAC, ±10%, 60 Hz, three-wire, single-phase (neutral center-tapped)
Output Trigger Pulses	Time-synchronized with the 60 Hz line
Time from Trigger Pulse to Trigger Pulse	33.3 milliseconds
Modes of Operation	Manual (local) control and remote control (+48 VDC or 120 VAC)
Enclosure	NEMA 4, outdoor and ventilated (to prevent condensation)
Maintenance Features on Control Cabinet	• Rotary control switch for manual control of brightness level of system • Flasher ON/OFF switch to de-energize flashers (if desired) when the approach lights are energized • LED indicators on control panel for system monitoring • Service entrance switch disconnects incoming power to the control unit • 100 W maintenance light • Door can be locked in a 120° open position
Dimensions	37.25 × 30 × 11.38 in 94.6 × 76.2 × 28.9 cm
Weight	137 lb (62 kg)

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.

High-Voltage Wire Ordering Code 89A0110-1

Flasher

Elevated Flash Head

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.

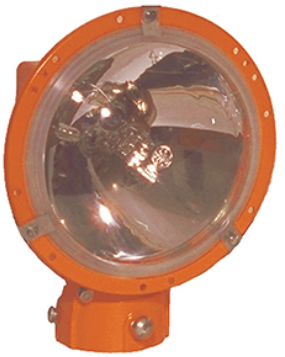


Table 3: Flash Head Unit Equipment Data

Input Voltage	+2,000 VDC
Lamp	PAR-56 xenon flashtube
Lamp Life	Average 1,000 hours on high-intensity step
Intensity Decrease	30% or less over minimum rated lamp life
Flash Duration	0-100 microseconds
Flash Skipping	Less than 1% with no consecutive skipping
Light Beam Axis	Adjustable vertically from the horizontal to 25° above the horizontal
Vibration	Withstands vibration in frequency range of 10 to 2,000 Hz in accordance with NEMA Standard FA1-3.01
Enclosure	Rain tight
Mounting	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.
Installation Distance	A maximum of 60 ft (18.3 m) from ICC
Dimensions	13.33 × 6.25 × 8.31 in (33.86 × 15.88 × 21.11 cm)
Weight	4 lb (1.8 kg)

Flash Head Ordering Code 44D1677 - X

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

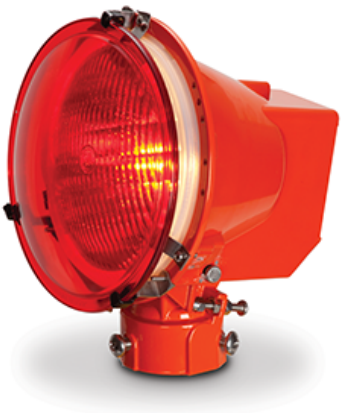
Note: Flash head includes lamp

Elevated 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

Note: In-pavement Flasher

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



Lamp Holders

PAR-38 Lamp Holder

There are 45 clear 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 spot 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.

Table 4: PAR-38 Equipment Data

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

PAR-38 Lamp Holder Ordering Code 44C1683

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

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. PAR-56 lamp holders are ordered separately. See data sheet 1042 for ordering information.

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 arrestors are provided for input and output lightning protection.

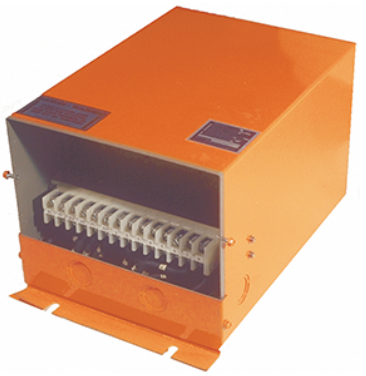


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Table 5: Power Transformer Equipment Data

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

15kVA Transformer Ordering Code 44D1685 - 1

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.

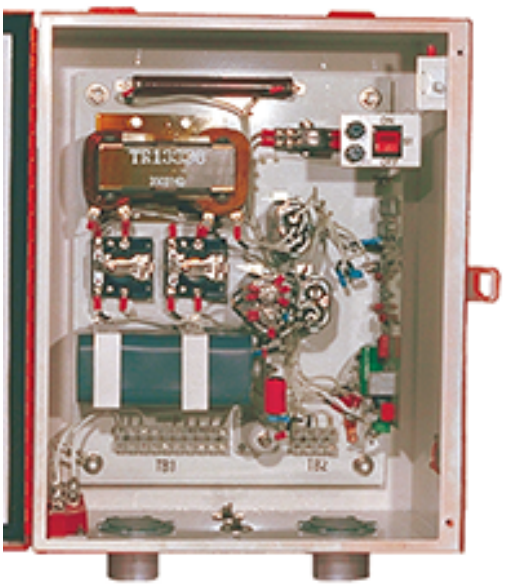

Table 6: ICC Equipment Data

Quantity	One for each flash unit
Enclosure	Outdoor, door handle can be padlocked
Input Voltage	120/240 VAC, 60 Hz, three-wire, (neutral center-tapped)
Input Current	1 A in high intensity (average)
Maximum Power Consumption	250 W or less
Intensity Step Change Component Life	150,000 operations minimum
Protection	All components are protected from high-voltage transients
Mounting	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.
Installation Distance	ICC can be installed a maximum of 3,000 ft (914.4 m) from master control cabinet
Dimensions	20 × 16 × 8 in (50.8 × 40.64 × 20.3 cm)
Weight	57 lb (25.85 kg)

ICC Ordering Code 44D1651 - X

Flasher Type

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

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°.

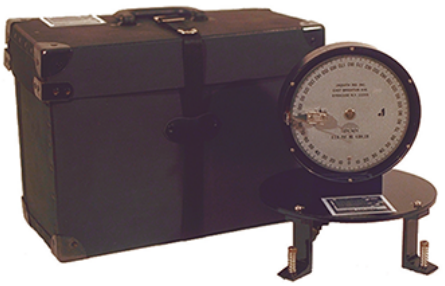

Table 7: Aiming Device Equipment Data

Quantity	One for each system
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. × 10 H in (17.78 dia. × 25.4 H cm)

Aiming Device Ordering Code

44D1654 - X

Lamp Application

1 = For PAR-56 Lamp Only

2 = For PAR-56 and PAR-38 Lamps

Spare Parts Trunk

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

Spare Parts Trunk

44D1652 - X 1 X 0

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

Notes

- 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

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.

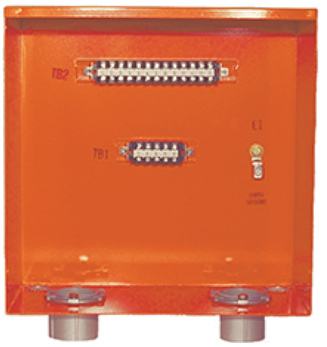

Table 8: Junction Box Equipment Data

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

Junction Box Ordering Code

44D1653

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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.

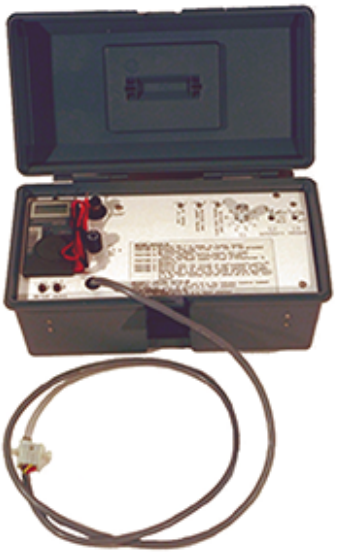

Table 9: Flasher Tester Equipment Data

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

Flasher Tester Ordering Code **44D1686 - 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 Arrestors
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.