INSTALLATION AND MAINTENANCE MANUAL

L-861, L-861T, L-861E QUARTZ/HALOGEN ELEVATED LIGHTS

PNs: L861-066-X(X)-X-X(X)

L861E-066-X(X)-1-XX(X)

L861T-066-X-XX-XX(X)

DME CORPORATION
6830 N.W. 16th TERRACE
FT. LAUDERDALE, FLORIDA 33309

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RECORD OF CHANGES

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(A)	17869	5/21/09	See ECO 17869
(B)	18755	9/23/10	See ECO 18755

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SECTION 1. GENERAL INFORMATION AND REQUIREMENTS

1.1 INTRODUCTION

This section describes the DME Corporation L-861, L-861E and L-861T Quartz/Halogen Elevated Lights.

The Elevated light is used to delineate the edges and end non-precision IFR airport runways and taxiways. These elevated lights are Electrical Testing Labs (ETL) certified according to FAA specification AC 150/5345-46C, and FAA specifications. The DME Corporation L-861 fixtures are available in the following lens colors. Refer to Table 1-1.

Table 1-1 Lens Colors

Light Fixture	Lens Color	Lamp
L-861	White/Yellow, Yellow, White,	30W/6.6 A Quartz or
L-861	White/Yellow, Yellow, White, White/Red, Yellow/Red, Green/Yellow	45W/6.6 A Quartz
L-861E	Red, Red/Green, Green/Blank	45W/6.6 A Quartz
L-861T	Blue	30W/6.6 A Quartz or
L-861T	Blue	45W/6.6 A Quartz

1.2 EQUIPMENT DESCRIPTION

The main items in the L861 Light are listed below and shown in Figure 1-1.

1.2.1 LIGHT ASSEMBLY

The major components of the Light Assembly consist of the housing assembly, light head assembly, clamp, cable assembly, frangible coupling, Electrical Metallic Tubing (EMT) and lens shown in Figure 1-1.

1.2.2 WIRE, TAXIWAY/EDGE LIGHT (L-823 CABLE)

The wire consists of a L823 cable, strain relief and fast receptacle connectors.

1.2.3 FRANGIBLE COUPLING

The frangible coupling is used to connect the EMT to the base plate.

1.2.4 ELECTRICAL METALLIC TUBING (EMT)

The EMT is used to connect the light assembly to the frangible coupling. The cable assembly runs through the EMT and connects to the power source. The EMT comes in various sizes to provide an overall height from 14 inches to 30 inches in 2-inch increments. The measurements for the various sizes are taken from the grade to the top of the fixture.

1.2.5 BASE PLATE MOUNT (OPTIONAL)

The L-861 light is typically installed on the L-867 base plate. Base mounting is recommended because maintenance is easier to perform. Optional mounting can be on stake mounted 30 inch galvanized steel stake.

1.2.6 STAKE MOUNT (OPTIONAL)

Optional stake mounting of the L-861 light is detailed in paragraph 7.4.4. Stake-mounted lights require transformer, cables, and connectors that are designed for direct earth burial.

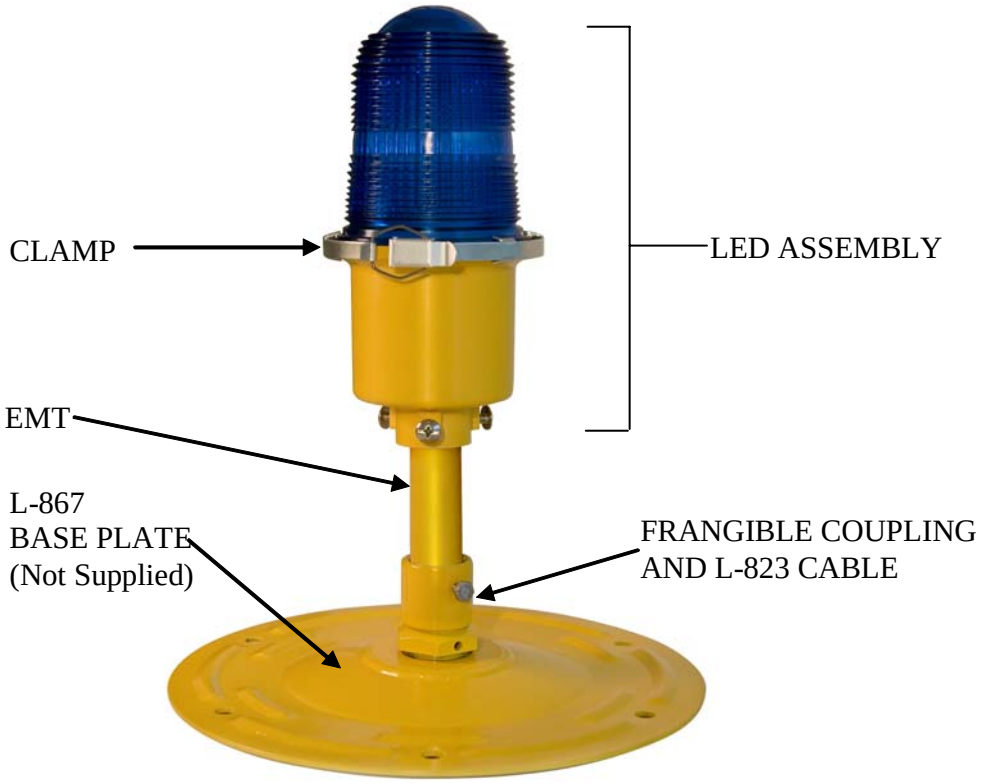

Figure 1-1 L-861 Elevated Light

1.3 EQUIPMENT SPECIFICATION DATA

Table 1-2 through Table 1-8 illustrate pertinent reference data on the L861 elevated lights. Included are tables containing functional characteristics, external power requirements, environmental characteristics, equipment and accessories supplied, and equipment required for operation and maintenance, but not supplied by DME Corporation.

1.3.1 FUNCTIONAL CHARACTERISTICS

Table 1-2 lists the functional characteristics of the L-861 lights.

Table 1-2 Functional Characteristics

Condition	Range
Power Consumption	30W or 45W
Optics	Omni directional or Bi-directional
Weight	~ 4 lbs with 14" EMT and frangible coupling
Height	14-30-inches in 2 inch increments
Housing	Painting Not Required
Rated lamp life	1000 hours

1.3.2 PHOTOMETRIC DATA

The L-861, L-861T and L-861E, passed all photometric requirements of AC-15/5345-46C.

1.3.3 EXTERNAL POWER REQUIREMENTS

Table 1-3 lists the external power requirements of the elevated lights.

Table 1-3 External Power Requirements

Input	Power
Current Control Regulator (CCR)	3 Step 4.8A, 5.5A or 6.6A
	5 Step 2.8A, 3.4A, 4.1A, 5.2A or 6.6A

1.3.4 ENVIRONMENTAL CHARACTERISTICS

Table 1-4 lists the environmental characteristics of the elevated lights.

Table 1-4 Environmental Characteristics

Condition	Range
Operating Temperature	-55°C to +55°C (-67°F to +131°F)
Temperature Shock	Exposure of the hot light fixture to cold water spray
Wind	Velocities up to 300 mph (482 kph)
Altitude	Sea level to 10,000 feet (3000 m)
Precipitation	Exposure to rain, snow, ice, and standing water
Solar radiation	Exposure to solar radiation

1.3.5 MECHANICAL CHARACTERISTICS

Table 1-5 lists the mechanical characteristics of the elevated lights.

Table 1-5 Mechanical Characteristics

Condition	Range
Yield Device	The lights have a yield point near the point or position where the light attaches to the base plate. The yield point is 1-1/2 inches (38.10 mm) above grade, and will give way before any other part of the fixture is damaged, and will withstand a bending moment of 150 foot-pounds (203 Newton-meters (N-m)) without failure.
Insulation Resistance	Resistance of 50 meg-ohms lead-to-case

1.3.6 EQUIPMENT AND ACCESSORIES SUPPLIED

Table 1-6 lists the equipment and accessories supplied for the elevated lights.

Table 1-6 Equipment and Accessories Supplied

Description	Quantity
Elevated light fixture (with optical lens, clamp, EMT, frangible coupling, and Light assembly)	1
Installation and Maintenance Manual	1 (with each order)

1.3.7 EQUIPMENT REQUIRED BUT NOT SUPPLIED

Table 1-7 and Table 1-8 list the equipment and accessories required for the elevated light, but not supplied by DME Corporation.

Table 1-7 Equipment and Accessories Required Not Supplied

Description	Quantity
Torque Wrench (0-200 inch-lbs)	1
Cross point screw driver	1
Isolation transformer for series circuit	1

Table 1-8 Isolation Transformers Not Supplied

Circuit	Transformer
6.6 A series circuit	L-830-1 (6.6 A/6.6 A, 45 W) for 60 Hz L-831-1 (6.6 A/6.6 A, 45 W) for 50 Hz
20 A / 6.6A series circuit	L-830-2 (20 A/6.6 A, 45 W) for 60 Hz L-832-2 (20 A/6.6 A, 45 W) for 50 Hz

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SECTION 2. OPERATION

This section of the manual describes the operational aspects of the Elevated light. The following paragraphs outline the details on controls, indicators, and system operation. Turn-on and turn-off operations are described, along with notes regarding safety hazards, where necessary.

2.1 MODES OF OPERATION

2.1.1 BRIGHTNESS SETTING

Set the CCR to the desired brightness level.

2.2 CONTROLS AND INDICATORS

There are no controls and indicators associated with the Elevated light. All controls and indicators for operating the lights are on the CCR.

2.3 TURN-ON AND CHECKOUT PROCEDURE

Turn on the lights using the CCR.

2.3.1 OPERATING MODES

The Elevated light will automatically switch between intensities depending upon the current from the CCR. There is no user interface to control light intensities.

2.3.2 CHECKOUT

To checkout the lights, turn on the CCR, step through the brightness levels, and observe intensity change on lights.

2.4 EQUIPMENT SHUTDOWN

Turn the equipment off the lights by turning off the CCR.

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SECTION 3. PERIODIC MAINTENANCE

3.1 INTRODUCTION

This section of the manual lists the maintenance tasks required for the Elevated Lights. This includes performance checks, on-site maintenance, and off-site maintenance. The performance checks and maintenance tasks in this section are required to ensure optimum equipment performance.

3.2 MAINTENANCE CHECKS

Table 3-1 lists the maintenance checks. To keep the light fixture operating efficiently, follow a preventive maintenance schedule. Refer to FAA AC 150/5340-26 for more detailed information.

Table 3-1 Maintenance Checks

Interval	Task	Action
Weekly	Check for vegetation	Remove vegetation.
Monthly	Check for misaligned fixture	Straighten, level and align
	Check for dirty optical column	Clean with glass cleaner
	Check housing weep holes	Clean weep holes
	Check for dirty frangible coupling weep holes (for stake-mounted fixtures only)	Clean weep holes
Annually	Check for improper ground elevation	Grade so frangible point is ~ 1 inch (25.4 mm) above ground elevation
	Check for improper light elevation	Maintain same elevation for all light fixtures
	Check Housing, EMT & Frangible Coupling for corrosion present or paint chipped	Touch up paint as necessary
Unscheduled	Make prediction of heavy snowfall, if necessary	Use red flags or sticks to mark location of fixtures to facilitate snow removal and less chance of damage to fixtures

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SECTION 4. MAINTENANCE PROCEDURES AND CHECKS

This section of the manual provides maintenance personnel with step-by-step procedures for performing the maintenance procedures. It also lists the maintenance tasks required for the Elevated Light.

4.1 MAINTENANCE PROCEDURES AND CHECKS

These procedures consist of the procedures required for testing, measuring, aligning, and repairing the Elevated Light. The tools and test equipment necessary for the performance of these procedures are also listed as required.

4.1.1 VISUAL OPERATIONAL CHECK

1. With the system operating, visually inspect each light to verify it is on.
2. Visually inspect each light for obvious misalignment.

4.2 OTHER ON-SITE MAINTENANCE

The following maintenance procedures are those required to perform the maintenance tasks listed in Section 3.

4.2.1 VISUAL CHECKS

1. With the system operating, visually inspect each Elevated Light to verify all lamps are on.
2. Visually inspect each light housing assembly for obvious misalignment.

4.2.2 LINE-OF-SIGHT INSPECTION

1. Visually inspect the lights for obstructions.
2. Refer to FAA specification AC 150/5340-24 for visibility requirements.

4.2.3 LENS AND HOUSING CLEANING AND INSPECTION

1. Inspect the lens, housing, and other parts for moisture and dirt.
2. Clean all moisture and dirt from the lens, inside and out.
3. Replace any damaged parts.

4.2.4 ACCESS TO INTERNAL COMPONENTS

1. Shut off CCR.
2. Remove the light fixture by doing the following:

a. Gain access to female plug under base plate and disconnect the cable plug of the light fixture from the female plug on the secondary lead of the isolation transformer.

b. Loosen the hex bolt that attaches the frangible coupling to the EMT column.

c. Pull the cable through the frangible coupling.

CAUTION: Do not the lamp bulb with bare fingers. Oil/Dirt from hands can cause premature failure of the bulb. Use a clean lint free cloth or gloves.

3. Remove lamp by loosening the band clamp around the lens and housing. Remove the lens and carefully pull the lamp out of its socket.

4.2.5 CLOSING ACCESS TO INTERNAL COMPONENTS

1. Make sure all components are correctly installed in the housing assembly.

2. Install the light fixture to the frangible coupling and Isolation Transformer by doing the following:

a. Insert the cable plug and EMT into the frangible coupling and tighten the hex bolt finger tight, then continue tightening the hex bolt ¼ turn from finger tight.

b. Connect the cable plug of the light fixture to the female plug on the secondary lead of the isolation transformer.

4.2.6 ELECTRICAL CONNECTIONS

1. Remove all power from the system.

2. Check that all connections and cable connections are tight and clean. Replace or tighten all connections and terminal lugs that show signs of heating.

4.2.7 ELECTRICAL COMPONENT INSPECTION

1. Visually inspect the electrical components for overall condition.

2. Inspect for chipped, cracked or broken parts.

3. Visually inspect wiring insulations for signs of deterioration such as brittle, cracked, or damaged insulation.

4. Check all terminal connections to ensure they are tight and corrosion free.

4.2.8 LAMP REMOVAL

1. Gain access to internal components. Refer to paragraph 4.2.4.

CAUTION: Do not the lamp bulb with bare fingers. Oil/Dirt from hands can cause premature failure of the bulb. Use a clean lint free cloth or gloves.

CAUTION: Care must be exercised to avoid putting excess pressure on the lamp to avoid breaking it.

2. Pull lamp from the socket.

4.2.9 LAMP INSTALLATION

1. Use only FAA approved lamps. Remove the lamp from its package, always handle the lamp by its protective wrapping. Fully insert the lamp's pins into the socket. Replace the lens and clamp.

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SECTION 5. CORRECTIVE MAINTENANCE

5.1 CORRECTIVE MAINTENANCE

5.1.1 INTRODUCTION

This section of the manual provides onsite corrective procedures in order to diagnose, isolate and repair malfunctions and faults that may be found in the Elevated Light in its operational environment. Field repair is limited to the replacement of easily replaceable components.

5.1.2 TEST EQUIPMENT REQUIRED

The following test equipment is required to perform the onsite corrective maintenance procedures:

- Standard tool kit
- Multi-meter

5.1.3 TROUBLESHOOTING PROCEDURES

The L-861 light must be operated as described in Section 2. When a fault or malfunction occurs, corrective maintenance is required by an onsite technician to isolate and correct the problem. The following items should be checked/verified before other troubleshooting/maintenance procedures are performed:

- Check all cables are connected
- Check all AC power connections are intact
- If the above do not correct the malfunction, refer to Table 5-1.

Table 5-1 Troubleshooting Procedures

Problem	Possible Cause	Corrective Action
Lamp not lighting	Defective lamp	Replace the lamp
	Loose wire connection	Tighten wire connections
	Deteriorated wire insulation	Replace wires
	Moisture present in fixture	Open and dry the housing assembly. Replace any damaged items
Light too dim	Dirty lens	Clean lens
	Service life of Lamp exceeded	Replace lamp

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SECTION 6. PARTS LIST

6.1 GENERAL

This section of the manual contains the source data of all electrical and selected mechanical replacement parts of the Elevated Light (Table 6-1).

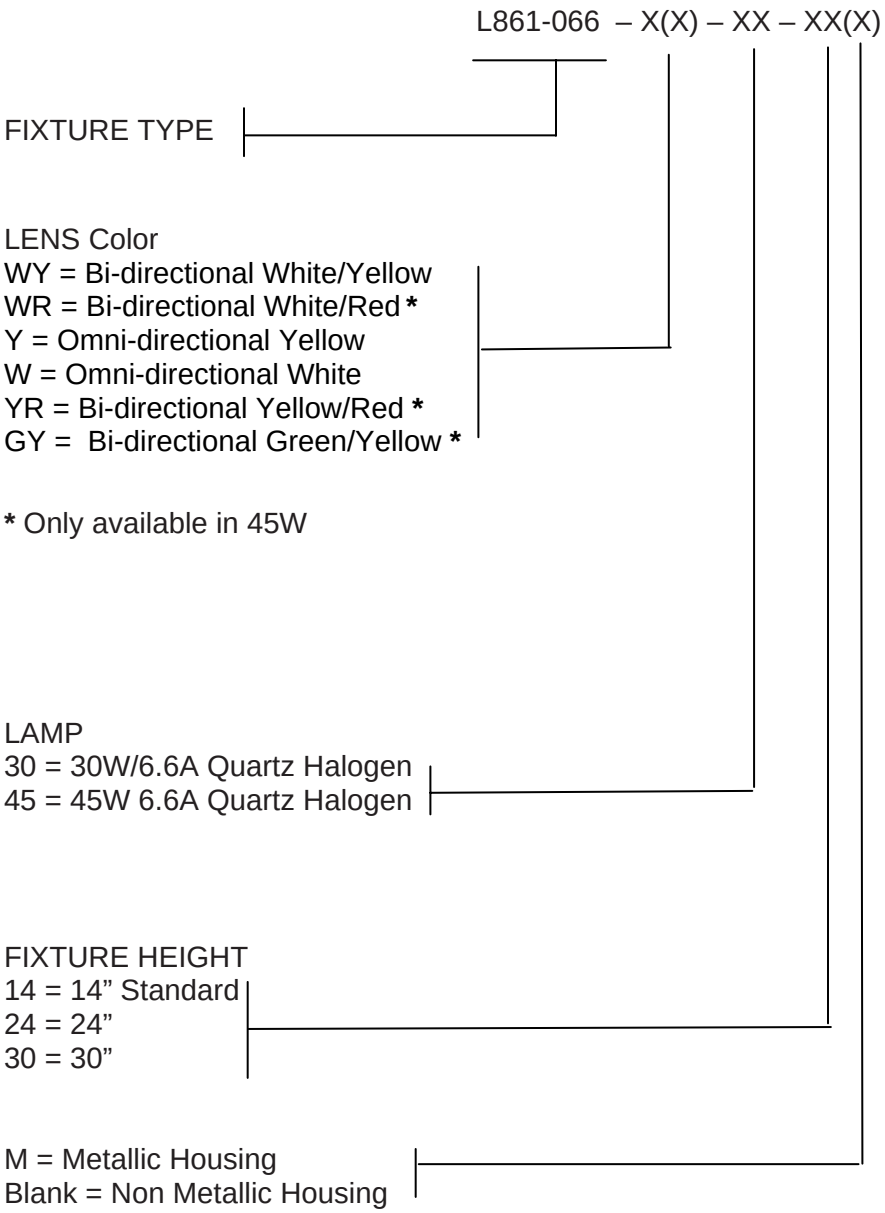
6.1.1 NAME OF PART AND DESCRIPTION

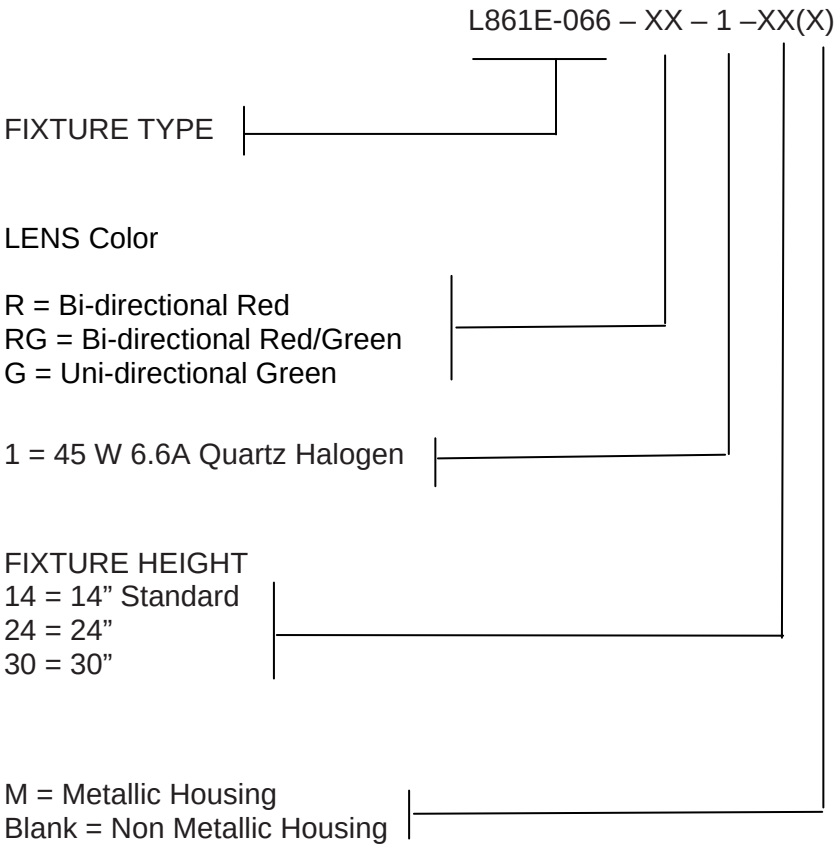
A brief electrical or mechanical description of each component is given in this column.

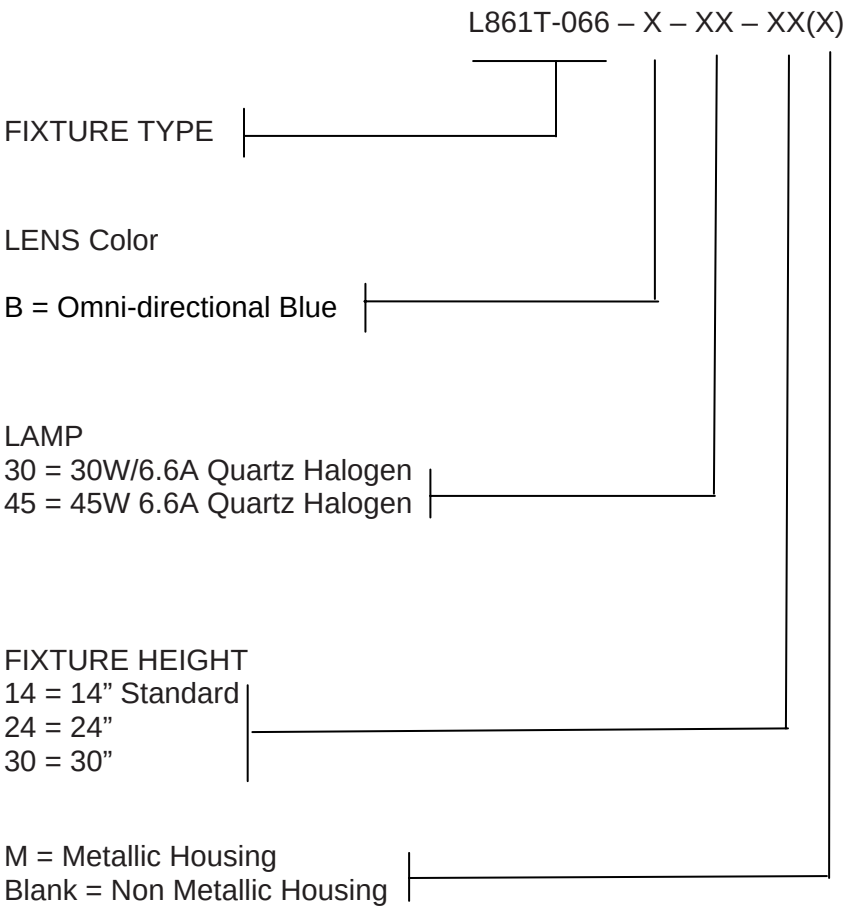
6.1.2 PART NUMBER

This column gives the designation assigned to a component.

6.1.3 ORDERING INFORMATION




L861E-066 – XX – 1 –XX(X)
FIXTURE TYPE
LENS Color
R = Bi-directional Red
RG = Bi-directional Red/Green
G = Uni-directional Green
1 = 45 W 6.6A Quartz Halogen
FIXTURE HEIGHT
14 = 14” Standard
24 = 24”
30 = 30”
M = Metallic Housing
Blank = Non Metallic Housing


L861T-066 – X – XX – XX(X)
FIXTURE TYPE
LENS Color
B = Omni-directional Blue
LAMP
30 = 30W/6.6A Quartz Halogen
45 = 45W 6.6A Quartz Halogen
FIXTURE HEIGHT
14 = 14” Standard
24 = 24”
30 = 30”
M = Metallic Housing
Blank = Non Metallic Housing

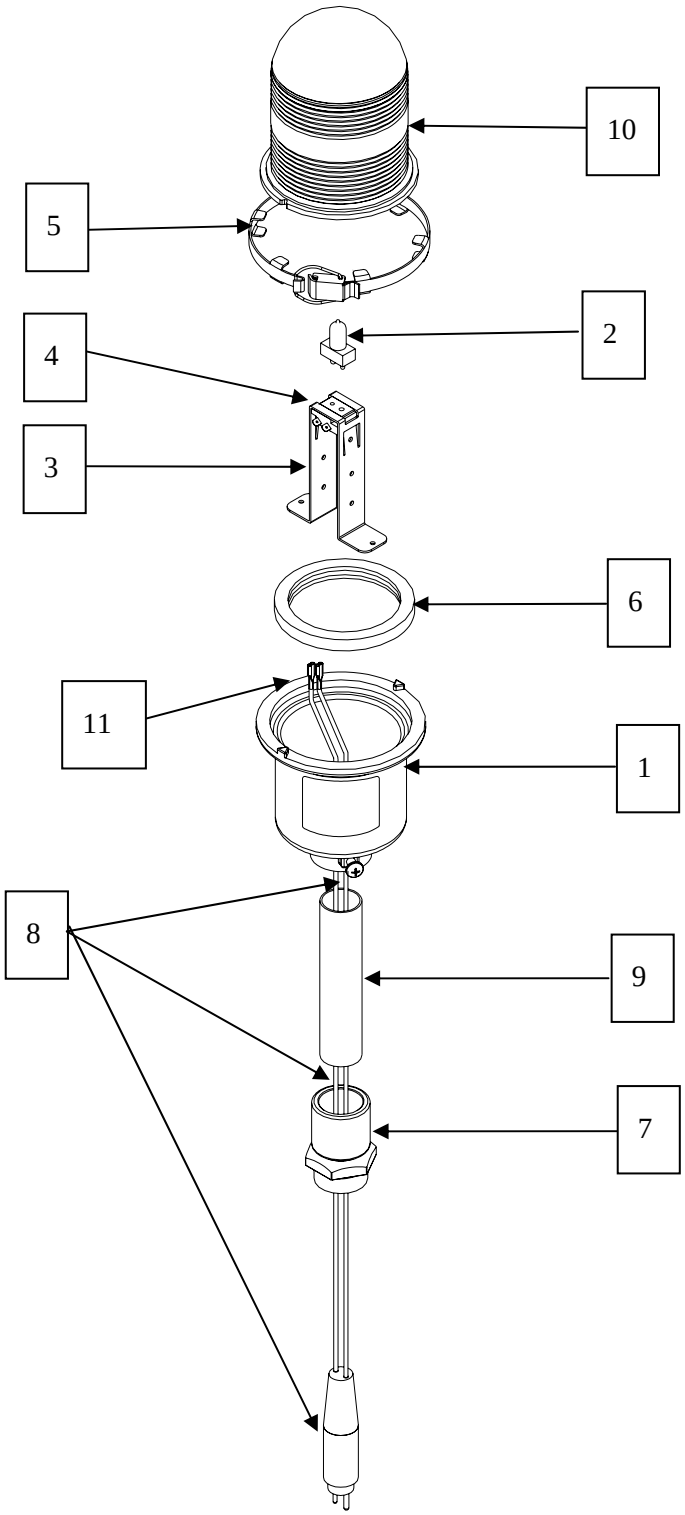


Figure 6-1 L-861T, L861E, and L861 Taxiway Light

Table 6-1 Parts List

Figure/Item	Part Name/Description	Part Number
Figure 6-1	L-861T, L-861E, and L-861 Taxiway Light	See paragraph 6.1.3
Item 1	Housing Assembly	
	Non Metallic	A1-17-1026-001
	Metallic	A1-17-1026-002
Item 2	Bulb	
	Quartz Halogen 30W bulb	11478-EXL
	Quartz Halogen 45W bulb	11482-EXM
Item 3	Hat	A1-17-1035-001 (1-required)
	Strain Relief Bushing	1140 (1-required)
	Tie- down Straps	MS3367-4-9 (4-required)
Item 4	Socket	F595370
Item 5	Clamp Band	A1-17-1027-001
Item 6	Lens Gasket	A1-25-0081-001
Item 7	1-1/2” Frangible Coupling	A1-17-1029-001
Item 8	Wire, Taxiway/Edge Light	10518-101-001
Item 9	EMT	
	EMT for 14”	A1-17-1034-01
	EMT for 24”	A1-17-1034-06
	EMT for 30”	A1-17-1034-09
Item 10	LENS	
	L-861	
	Omni-directional White	A1-32-0001-002
	Omni-directional Yellow	A1-32-0001-003
	Bi-directional White/Yellow	A1-32-0001-006

	Bi-directional White/Red	A1-32-0001-007
	Bi-directional Yellow/Red	A1-32-0001-008
	Bi-directional Green/Yellow	A1-32-0001-011
	L-861E	
	Bi-directional Red/Green	A1-32-0007-001
	Bi-directional Red	A1-32-0007-002
	Uni-directional Green	A1-32-0007-003
	L-861T	
	Omni-directional Blue	A1-32-0001-010
Item 11	Fast-On Connectors	14RBD-182

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SECTION 7. INSTALLATION

7.1 INTRODUCTION

This section of the manual contains general instructions for installation of a L-861 Elevated Taxiway light at a typical site. Refer to the airport project plans and specifications for the specific installation instructions.

7.2 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 may lead to detection of equipment damage.

7.3 PLACEMENT

This subsection describes the placement of the L-861 light fixtures. Follow he guidelines below, along with FAA specification AC 150/5340-24 and site plans, when placing the L-861T light fixture.

- The L-861T light fixture is normally positioned a maximum of 10 feet (3.048m) off the edge of the hard surface of the taxiway, and in a straight line with all other light fixtures on the same side of the runway.
- The longitudinal spacing of the light fixtures should not exceed 200 feet (60.96 m) to define the lateral limits of the taxiing paths. The longitudinal spacing of the lights is influenced by the physical layout of the taxiways.
- Closer spacing of the light should be provided on short taxiway sections, curves, and entrances to taxiways from runways or aprons.

7.4 INSTALLATION

This subsection provides installation instruction for the L-861 light fixtures.

7.4.1 BASE MOUNTING

L-861 light fixtures can be mounted on an L-867 base plate with a diameter and bolt-hole corresponding to either a 12 inch (304.8 mm) diameter L-867B base or a 16 inch (406.4 mm) diameter L-867D base plate per FAA AC 150/5345-46. The base plate is designed to receive a frangible coupling using a female thread. The standard coupling thread is 1-1/2-12. A gasket is supplied wit the base plate to form a watertight seal between the base plate and the L-867 light base per FAA AC 150-5345-42.

NOTE: Install the base according to FAA Advisory Circular AC 150-5340-24 and site plans.

7.4.2 LIGHT BASE MOUNTING

1. Install the L-867 base on undisturbed soil. If the soil is unsuitable, remove soil to an adequate depth and replace with compacted acceptable material.

NOTE: In closed duct systems, install in soil conditions with good drainage. Use light bases having a drain hole to prevent water accumulation.

2. Orient the cable entrance hubs of the light base in the proper directions according to site plans.

3. Level the light base so that the mounting flange surface is level with the finished grade.

4. With the base at the proper orientation and held at proper elevation, place approximately 4 inches (101.6 mm) of concrete backfill around the outside base.

NOTE: If the concrete backfill is omitted, the earth backfill must be compacted to maintain proper elevation and orientation of the base.

5. Slope the top of the concrete away from the flange portion of the base so the sloped outer edges of the concrete are a surface grade.

6. Connect the field circuit to the appropriate isolation transformer. Refer to Table 1-8.

NOTE: Use a brick to raise the transformer about 3 inches above the bottom surface of the L-867 light base to avoid the possibility of the transformer being partially immersed in water in case water accumulates above the level of the ducts or pipes.

After connecting transformer, check the continuity of the series loop.

7. Wrap the connector joints in the primary circuit with at least one layer of rubber or synthetic rubber tape and one layer of plastic tape one-half lapped, extending at least 1-1/2 inches (3.81 cm) on each side of the joint.

8. Clamp the female secondary plug from the isolation transformer to the L-867 base plate fitting using the clamp device supplied with the base plate.

9. Bolt the base plate with the base plate gasket to the L-867 base using six 3/8-16 stainless steel bolts. Apply a drop of thread lock to each bolt thread, and torques bolts to 100-110 inch-lbs. (11.3Nt-m).

10. Once the base plate is installed, the light fixture assembly is ready to install.

11. Connect the male plug from the light fixture to the female plug on the secondary lead of the isolation transformer by first loosening the frangible coupling hex screw until the coupling if free. Then retighten the hex screw finger tight.

12. Plug the cable into the mating isolation transformer secondary lead.

13. Loosen the hex screw on the coupling to free the coupling. Hand screw the coupling into the base plate hub. Finish tightening the coupling with a wrench.

CAUTION: Do not tighten the coupling if the coupling hex screw is still tight. Damage to the cable connection to the transformer will occur.

14. Tighten the coupling screw that secures the column to the frangible coupling and the adjustable head.

15. Level the light fixture. Refer to 7.4.3.

7.4.3 LIGHT FIXTURE LEVELING

NOTE: Level the light fixture only after mounting it on the base.

1. Remove clamp and lens, refer to 4.2.4, step 3. Slightly loosen the three cross point screws on the bottom of the housing.

CAUTION: If the Arctic kit is installed, use care when removing the LED lens assembly. There are two wires attached from the heater assembly in the LED housing to the heater element attached to the lens that must be disconnected.

2. Place a level on top of the housing. Level the housing by adjusting the three cross point leveling screws.

3. Install lens and clamp, refer to 4.2.5.

7.4.4 STAKE MOUNTING (OPTIONAL)

Mount the column light fixtures on 30 inch (762 mm) galvanized steel stake with a fitting attached to the top of each stake to receive the male thread of the frangible coupling. Stake mounting requires cable and connections that are designed for direct earth burial. Install according to appropriate FAA and local contractor specifications.

1. Assemble the stake by attaching the stake hub to the metal stake using two 3/8-16 x ¾ inch hex head screws and 3/8 inch lock washers.

2. Install the stake in 6 inch diameter holes in the ground at a depth of 30 inches so the mounting hub of the stake is level.

NOTE: The top of the stake should be even with the ground within one degree of the vertical. In areas where frost may cause heaving, anchor the stake with concrete and use a permeable backfill material such as sand around the buried electrical components. Cover the top surface with an impervious material to reduce moisture penetration.

CAUTION: Do not drive stakes. Driving stakes may damage the stake and cause light fixture misalignment. Refer to FAA specification AC 150/5340-24.

3. Backfill around the stake with compacted earth passing a 1 inch (25.4 mm) sieve.

NOTE: Use a level to make sure the stake is vertical before backfilling around the stake. Backfill with concrete in case of unstable soil conditions.

4. Make electrical connections by installing the transformer primary cables to the field circuit. Then insert the transformer secondary plug in the cable connectors supports forked tine and attach the cable connector support to the stake hub using ¼-20 x ¾ inch hex head screw and ¼ inch lock-washer.

NOTE: The small hole at the lower end of the stake is provided for a counter poise wire connection.

5. Install the light fixture on the stake.
6. Level the light fixture, refer to 7.4.3.