
L-849I LED STYLE A, C & E
RUNWAY END IDENTIFIER LIGHT (REIL) SYSTEM

User Manual

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ETL Certified to FAA Specifications
AC 150/5340-30H, AC 150/5345-51B
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Record of Changes

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Astronics DME warrants products against mechanical, electrical, physical, and workmanship defects for a period of two years from the date of manufacture or one year from the date of installation, whichever occurs first.*

This warranty, excludes consumable items such as batteries, filters, or lamps,

Astronics DME will repair or replace, at its option, equipment or parts, which fail because of mechanical, electrical, physical, or workmanship defects, provided the equipment or parts were installed operated or maintained in accordance with approved practice, and used for the intended purpose. Any product which has been repaired or altered in such way, in Astronics DME's judgment, as to affect the product adversely will not be covered under warranty.

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Astronics DME Customer Product Support
6830 NW 16th Terrace, Fort Lauderdale, FL 33309
DMEsupport@astronics.com
(954) 975-2206

*In accordance with FAA requirements, Astronics DME warrants LED airfield lighting products against electrical defects for a period of four years from the date of installation.

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1. SAFETY

1.1 Introduction

This section contains general safety instructions. Some safety instructions may not apply to the equipment in this manual. Specific warnings are included in the manual where appropriate. Follow all warnings, cautions and notes in the instructions carefully as failure to do so may result in personal injury, death, or damage to equipment.

To use this equipment safely

- Refer to the FAA Advisory Circular AC 150/5340-26, Maintenance of Airport Visual Aids Facilities, for instructions on safety precautions.
- Observe all safety regulations. Always remove power prior to making any wire connections and touching any parts.
- Read and become familiar with the general safety instructions provided in this section of the manual before installing, operating, maintaining, or repairing this equipment.
- Read and carefully follow the instructions given throughout this manual for performing specific tasks and working with specific equipment.
- Keep this manual within easy access of 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.
- Obtain and read Material Safety Data Sheets (MSDS) for all materials used.

1.2 Safety Symbols

Become familiar with the safety symbols presented in this section. These symbols will alert you to safety hazards and conditions that may result in personal injury, death, or damage to equipment.



May result in personnel injury or death.

CAUTION

May result in damage to equipment.

NOTE

Informational guidance.

1.3 Qualified Personnel

Defined as personnel 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.

1.4 Intended Use

Astronics DME is not responsible for injuries or damages resulting from nonstandard, unintended applications of its equipment. This equipment is designed and intended only for the purpose described in this manual. Uses not described in this manual are considered unintended uses and may result in serious personal injury, death, or equipment damage.

Unintended uses may result from taking the following actions:

- Making changes to equipment that have not been recommended or described in this manual or using parts that are not genuine Astronics DME replacement parts.
- Failing to make sure that auxiliary equipment complies with approval agency requirements, local codes, and all applicable safety standards
- Allowing unqualified personnel to perform any task.

1.5 Installation

Read and understand the installation section of all system component manuals before installing the equipment.

- Failure to follow safety procedures may result in injury or death.
- Allow only qualified personnel to install the equipment.
- Use only approved equipment. Using unapproved equipment in an approved system may void agency approvals.
- Make sure all equipment is rated and approved for the environment in which you are using it.
- Follow all instructions for installing components and accessories.

- 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.

1.6 Operation

Only qualified personnel 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 using 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.
- 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.
- DO NOT touch exposed electrical connections on equipment while the power is ON.

1.7 Equipment Malfunctions

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.

1.8 Maintenance and Repair

Allow only qualified personnel to perform maintenance, troubleshooting, and repair tasks. Only properly trained personnel are permitted to service this equipment.

- Always use safety devices when working on this equipment.
- Follow the recommended maintenance procedures in your equipment 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 Astronics DME replacement parts. Using unapproved parts or making unapproved modifications to equipment may void agency approvals and create safety hazards.
- Check 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 electrical equipment.

2. DESCRIPTION

2.1 Introduction

This section describes the Astronics DME L-849I Style A, C & E LED Runway End Identifier Light (REIL) System. The REIL is shown in Figure 2-1.



Figure 2-1 L-849I REIL

2.2 Equipment Description/ Theory of Operation

The L-849I REIL system is used to identify the threshold (approach end) of a visual or instrument non-precision runway and provides guidance to pilots during approach for landing. The REIL consists of two uni-directional simultaneous flashing LED lights. A light is located at each side of the runway threshold.

The system can be set to low, medium, or high intensity to compensate for varying visibility conditions. The Astronics DME L-849I REIL System complies with AC 150/5340-30H, AC 150/5345-51B FAA Engineering Brief No.67D and ICAO Annex 14, Vol.1, para. 5.3.8.

The REIL type L-849I is powered by a constant current regulator 6.6A power supply.

Style A - Unidirectional, high intensity, one brightness step.

Style C - Unidirectional, low intensity, one brightness step.

Style E - Unidirectional, three brightness steps.

Equipment Description/Theory of Operation (cont.)

2.2.1 Optical Assemblies

The L-849I REIL System consists of two optical assemblies (Identifier Unit Assemblies [IUAs]). The major components of the L-849I REIL System are described in the following paragraphs.

See Figure 2-1 and Figure 8-1. No special tools are required for maintenance.

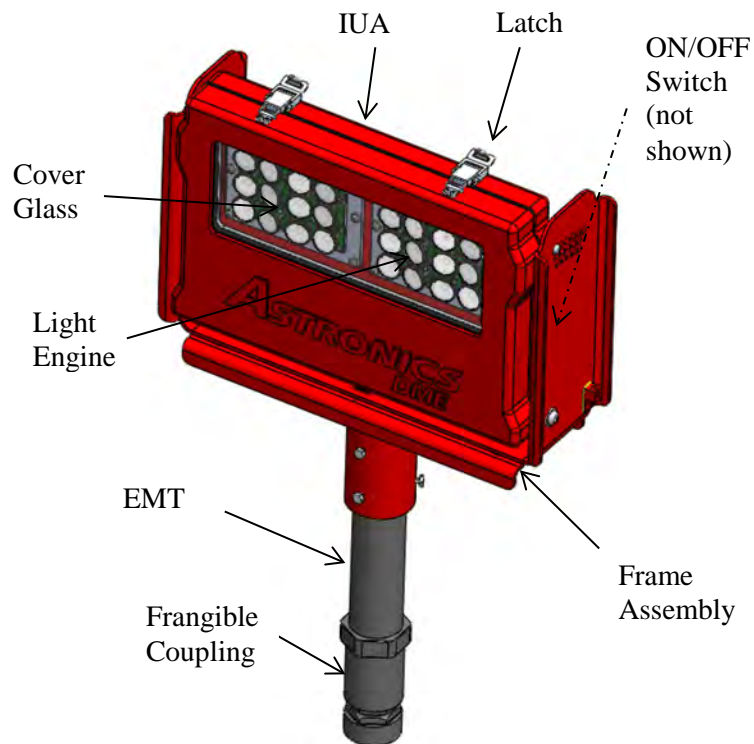


Figure 2-2 L-849I REIL

2.2.2 Identifier Unit Assembly (IUA)

The IUA is an outdoor rain tight enclosure mounted vertically to a 2-inch electrical metallic tubing (EMT). It contains the Light Engines and circuitry used to flash the light engines.

2.2.3 Frame Assembly, L-849I

The Frame Assembly holds the Identifier Unit Assembly (IUA) and allows for horizontal adjustment of $\pm 15^\circ$ and vertical adjustment of $+15^\circ$. It is secured to EMT and attaches to the Frangible Coupling.

**Equipment
Description
(cont.)**

- 2.2.4 Interlock Switch** The Interlock Switch provides safety protection when the IUA is opened, by turning off the power coming from the CCR to the Driver PWA. When replacing the interlock switch, the insulator block must be removed. Upon reinstallation, use RTV on screws for insulator block.
- 2.2.5 Driver PWA, L-849I** The Driver PWA is used to accept incoming power from the isolation transformer and flash the Light Engines 120 times per minute +/- 10%.
- 2.2.6 Frangible Coupling, L-849I** The Frangible Coupling is designed to break at a defined force and is used to attach the L-849I to the Base Plate L-867 (Not Supplied).
- 2.2.7 Light Engine Assembly, L-849I** The Light Engine Assembly consists of the LEDs, LED PWAs and is powered by the Driver PWA.
- 2.2.8 ON/OFF Switch** The ON/OFF Switch turns on/off the power from the CCR to the Driver PWA.

2.2.9 Functional Characteristics

Table 2-1 list the Functional Characteristics of the L-849I REIL System.

Table 2-1 Functional Characteristics

Unit	Requirements
Optical Assembly	Styles A, C, and E: Optical Pattern of 10° vertical by 30° horizontal.
	The optical head must be adjustable vertically from 0° to 15° and horizontally 15° each side of a zero reference point.
	Aiming reference scales must be graduated in a maximum of one degree increments.

2.2.10 Photometric Data

Table 2-2 lists the photometric data for the L-849I REIL system.

Table 2-2 Photometric Data L-849I

Type	Style	Effective Intensity in candelas (cd)		
		Brightness Step		
		High	Medium	Low
L-849	A	15,000	--	--
L-849	C	--	--	700
L-849	E	15,000	1,500	300

Table 2-3 Single Intensity Switch Functions

Switch position	Switch Function
ON	System ON
OFF	System OFF

2.2.11 External Power Requirements

Table 2-4 lists the external power requirements of the L-849I REIL system.

Table 2-4 External Power Requirements

Input	Power
Constant Current Regulator (CCR)	1, 3 or 5 step - 2.8A to 6.6A

Table 2-5 lists the external power requirements of the L-849I REIL system.

Table 2-5 External Power Requirements -2

Maximum Power Consumption	
Style A/E	
Peak VA	117 VA
Peak Wattage	96.2 W
Avg Wattage	54W
Style C	
Peak VA	45 VA
Avg Wattage	30W

2.2.12 Environmental Characteristics

Table 2-6 lists the environmental characteristics of the L-849I REIL system.

Table 2-6 Environmental Characteristics

Condition	Range
Temperature: Operating Shock	-40°C to +55°C (-40°F to +131°F) Operates and is not damaged by the sudden application of cold water to the light emitting surface of an optical assembly at its normal operating temperature.
Altitude	Operates at altitudes from sea level to 10,000 feet (3,000 meters).
Humidity	Operates at any relative humidity up to 100%, including conditions of dew or frost.
Salt Spray	Operates when exposed to a salt laden atmosphere.
Sand and Dust	Operates when exposed to windborne sand and dust particles.
Rain	Operates when exposed to wind-blown rain from any direction
Wind	Operates when exposed to wind velocities of 150 knots (278 kilometers per hour).
Solar Radiation (Sunshine)	Operates when exposed to solar radiation.

2.2.13 Equipment and Accessories Supplied

Table 2-7 lists the equipment and accessories supplied for the L-849I REIL system.

Table 2-7 Equip and Accessories - Supplied

Description	Quantity
L-849I REIL System	System includes: 2 IUAs with EMT and frangible coupling
User Manual - Y3-01-0180	Manual can be downloaded at www.astronics.com

2.2.14 Equipment Required -Not Supplied

Table 2-8 through Table 2-9 list the equipment and accessories required but not supplied for the L-849I REIL system.

Table 2-8 Equip and Accessories Req'd- Not Supplied

Description	Quantity
Isolation transformer for series circuit - L-849I	2
Base Plate L-867	2
Wire Extraction Tool – Astronics DME PN A1-03-0281-000	1

Table 2-9 Isolation Transformers - Not Supplied

Circuit	Transformer	
6.6 A, 50Hz & 60Hz, series circuit	150W-60 Hz - L-830-18 50 Hz- L-831-18	Style A and E
6.6 A, 50Hz & 60 Hz, series circuit	30/45W-60 Hz – L-830-1 50 Hz- L -831-1	Style C only

3. INSTALLATION

WARNING

Allow only qualified personnel to perform the following tasks. Observe and follow the safety instructions in this document and all other

3.1 Introduction

This section of the manual contains general instructions for installation of an L-849I REIL system at a typical site. Refer to the airport project plans and specifications for the specific installation instructions.

3.2 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.

3.3 Placement

This subsection describes the placement of the L-849I REIL system. Follow the guidelines below, along with FAA specifications and site plans, when placing the light fixture.

3.4 Installation

This subsection provides installation instruction for the L-849I REIL system. Also refer to Appendix A for Installation Instructions.

3.4.1 Base Mounting

The L-849I REIL light fixture 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 male thread. The standard coupling thread is 2-11½. A gasket is supplied with the base plate to form a watertight seal between the base plate and the L-867 light base per FAA AC 150-5345-42.

3.4.2 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.

Installation (cont.)**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 at surface grade.
6. Connect the field circuit to the appropriate isolation transformer. Refer to Table 2-9.

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. Connect the L-823 5-Pin Cable Assembly Adapter to the female secondary plug from the isolations transformer.
9. Connect the orange wire from the L-823 8-Pin Cable Assembly Adapter to the black wire of the wiring going between the two light fixtures.
10. Connect the red wire from the L-823 8-Pin Cable Assembly Adapter to the red wire of the wiring going between the two light fixtures

Installation (cont.)

11. Clamp the female plug from the L-823 5-Pin Cable Assembly Adapter to the L-867 base plate fitting using the clamp device supplied with the base plate.

Once the base plate is installed, the L-849I REIL is ready to be installed.

12. 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 torque bolts to 100-110 inch-lbs. (11.3Nt-m).
13. Position the light fixture close to the L-867 base.
14. Loosen the 6 bolts on the light fixture Frame Assembly where it goes over the EMT. See Figure 3-1.
15. Route the male plug from the L-849I REIL EMT and Frangible Coupling and connect to the L-823 8-Pin Cable Assembly Adapter.
16. Install the light fixture on the L-867 and tighten the Frangible Coupling to the base plate, torque to 40 ft-lbs.
17. Tighten the six 1/4-20 set screws on the Frangible Coupling to the EMT, torque to 100 in-lbs.
18. Align the light fixture per 3.4.3.
19. The L-849I REILs must be set for
 - a. Style A, C or E
 - b. Primary/Secondary
 - c. and 3 or 5 step CCR being used, refer to 3.4.3.3.
20. After the REIL installation is complete perform checkout per 4.23.

3.4.3 Light Fixture Alignment

See Figure 3-1 and Figure 3-2.

3.4.3.1 Horizontal Alignment

After performing the Light Base Mounting per 3.4.1 and 3.4.2 aim the L-849I to the orientation specified for the airfield by performing the following steps.

1. Ensure the mark on the frame is aligned to the alignment scale.
2. Align the front face of the IUA and Frame Assembly perpendicular to the runway.
3. Tighten the set screws, where it goes over the EMT, to 100 in-lbs.
4. Loosen the 4 bolts on the Support Frame and adjust the angle to 15° away from the centerline of the runway.
5. Tighten the 4 bolts on the Support Frame to 40 ft.-lbs.

Installation (cont.)

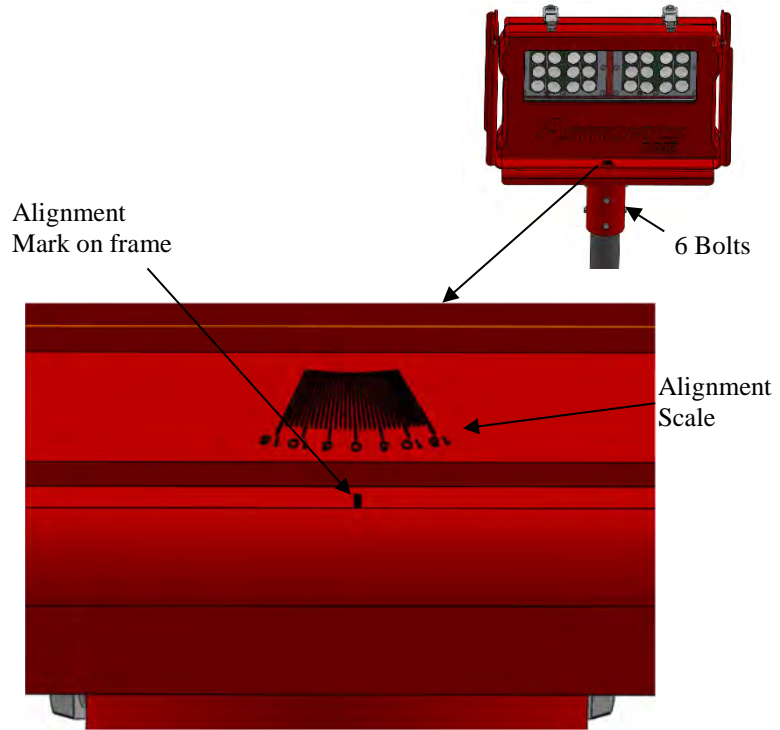


Figure 3-1 Horizontal Alignment Markings

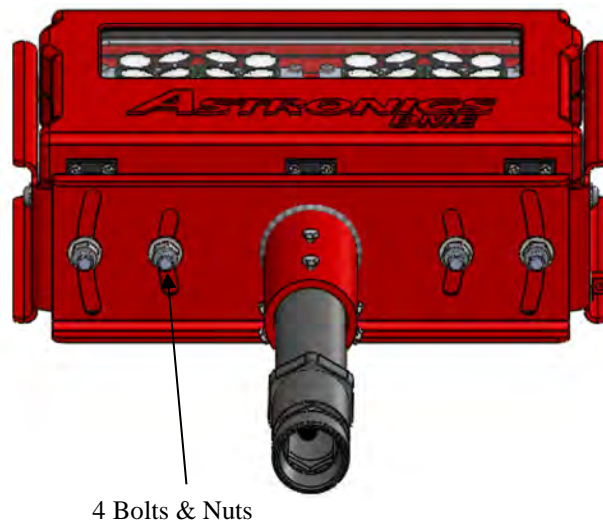


Figure 3-2 Horizontal Alignment Bolts

Installation (cont.)**3.4.3.2 Vertical****Alignment** See Figure 3-3.

1. Remove the 2 vertical alignment fasteners (one from each side of the L-849I) from the Support Frame Assembly.
2. Slightly loosen the 2 fasteners holding the Housing Assembly to the Support Frame.
3. Vertically position the front of the L-849I by installing the 2 vertical alignment fasteners to 10° (or as detailed in the site plans) and torque to 72 inch-lbs.
4. Torque the 2 fasteners holding the Housing Assembly to the Support Frame to 11 ft.-lbs.

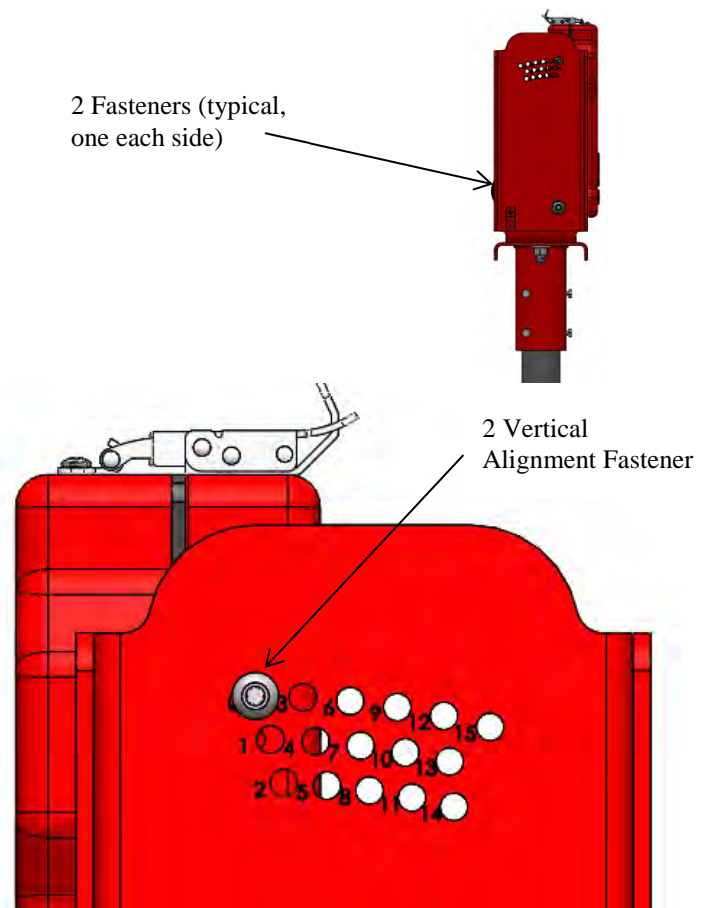


Figure 3-3 Vertical Alignment

Installation (cont.)**3.4.3.3 Style, Primary
Secondary, and
CCR
configuration
settings**

The L-849I REILs must be set for Style A, C or E, Primary or Secondary and 3 or 5 step CCR.

Ensure one IUA is set to Primary and the other is set to Secondary per 7.2.3.

Ensure the dip switches on the Driver PWA are set correctly per 7.2.4 and Figure 7-6, Figure 7-7 and Figure 7-9.

4. OPERATION

4.1 Introduction

This section of the manual describes the operational aspects of the L-849I REIL system. 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

4.2 Operational Checks

4.2.1 Modes of Operation

The L-849I REIL system is configured for a 3 or 5 Step 6.6A Constant Current Regulator (CCR) depending on the style.

4.2.2 Brightness Settings

Style E only, set the CCR to the desired brightness level.

4.2.3 Turn On

Turn ON the ON/OFF Switch and turn on the lights using the CCR. There is a 15 second delay once power is applied before the lights will begin flashing. This delay will not occur in the event of momentary power loss or brown out due to stored energy within the unit.

4.2.4 Operating Modes

The L-849I REIL Style E system will automatically switch between intensities depending upon the current from the CCR. There is no user interface to control light intensities.

4.2.5 Checkout

To checkout L-849I REIL Style E system, turn on the CCR, step through the brightness levels, and observe intensity change of lights.

4.2.5.1 Equipment Shutdown

Turn off the L-849I REIL system by turning off the CCR and/or turn OFF the ON/OFF switch.

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5. MAINTENANCE

5.1 Introduction

This section of the manual lists the maintenance tasks required for the L-849I REIL system. 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.

5.2 Maintenance Checks

5.2.1, 5.2.2, 5.2.3 and 5.2.4 lists the maintenance checks to keep the L-849I REIL system operating efficiently, follow a preventive maintenance schedule. Refer to FAA AC 150/5340-26 for more detailed information.

5.2.1 Daily Checks

- Check that lamps are operating and are flashing in proper sequence.

5.2.2 Bi-monthly Checks

- Check the controls for proper operation. Observe operation on each intensity step.
- Check cleanliness of optical surfaces, both interior and exterior.
- Check for damage or misaligned lights.
- Check interlock device on door of each cabinet. Verify that shutdown occurs when each door is opened.
- Check for vegetation or other obstruction around lights.

5.2.3 Semi-Annual Checks

- Check the interior of IUA cabinets for cleanliness and moisture.
- Check and adjust alignment and elevation of light units. Check alignment and elevation using the following tools:
 - A plywood triangle cut to angles of 15°, 80°, and 85°.
 - A 4-inch line level.
- The procedure to align the unidirectional REIL is as follows:
 - To check the 15° toe-out, hold the triangle horizontally against the face with the 15° angle pointed toward the other light unit. By aligning the outside edge of the triangle to point at the opposite light unit, 15° toe-out is achieved.
 - To attain the 10° vertical aiming, the 80° angle is placed against the flat portion of the REIL face with the 15° point-down. When the line level shows the upper edge of the triangle level, the REIL is 10° up from the horizontal.

5.2.4 Annual Checks

- Make a careful inspection of all power distribution equipment and protective devices at terminal pole and lights.
- Check insulation resistance of power cables.
- Check the ground resistance at the terminal pole and each light fixture.
- Repaint as required.

6. TROUBLE SHOOTING

6.1 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 L-849I REIL system in its operational environment. Field repair is limited to the replacement of easily replaceable components.

6.2 Equipment Required

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

- Standard tool kit
- Multi-meter

6.3 Troubleshooting Procedures

The L-849I REIL system must be operated as described in Section **Error! Reference source not found.** 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 power connections are intact
- Wait 15 seconds after applying power to verify the unit is working, there is a 15 second delay after power is applied before the unit begins flashing.

If the above do not correct the malfunction, refer to [Table 6-1](#).

CAUTION

When removing and replacing the electronics module, handle with care to avoid damage to discrete components that can be caused by electrostatic discharge. To avoid voltage overload, make sure the power is turned off when the replacement of a module is required.

NOTE

If a malfunction occurs that shuts down the system, the system may be restarted and will continue to operate for approximately 2 minutes for troubleshooting purposes. Fault shutdown is disabled.

Table 6-1 Troubleshooting Procedures

Problem	Possible Cause	Corrective Action
LED(s) not lighting	Defective LED	Replace Light Engine per 7.25.
	Defective Driver PWA	Replace Driver PWA per 7.2.2.
	Loose wire connection	Tighten wire connections. Ensure connections are correct per Appendix B.
	Deteriorated wire insulation	Replace wires. Ensure connections are correct per Appendix B
	Internal components wired incorrectly	Ensure components are connected per Appendix B.
	IUA tilted	Realign IUA per 3.4.3.
LED(s) too dim	Dirty lens	Clean lens per 7.2.13.
	Service life of LED exceeded	Replace Light Engine per 7.25.
	Glass Cover improperly aligned/cracked/chipped	Replace Glass Cover per 7.2.6.

7. REPAIR

7.1 Introduction

This section of the manual provides maintenance personnel with step-by-step procedures for performing the maintenance procedures required for the L-849I REIL system. These repair procedures will only show one configuration and are typical for the other configurations.

7.2 Repair and Maintenance Procedures

These procedures consist of the tasks required for testing, measuring, aligning, and repairing the L-849I REIL system. The tools and test equipment necessary for the performance of these procedures are also listed as required.

7.2.1 Access to Internal Components

See Figure 7-1 and Figure 7-2.

7.2.1.1 Opening

1. Turn CCR power OFF.
2. Turn OFF ON/OFF Switch.
3. Remove lock(s) if installed.
4. If required for greater access in the IUA, remove 2 alignment fasteners, push the top of the IUA back to open IUA apart.
5. Unlatch Padlockable latches.
6. Slowly rotate the front of the IUA down to open the IUA and gain access.

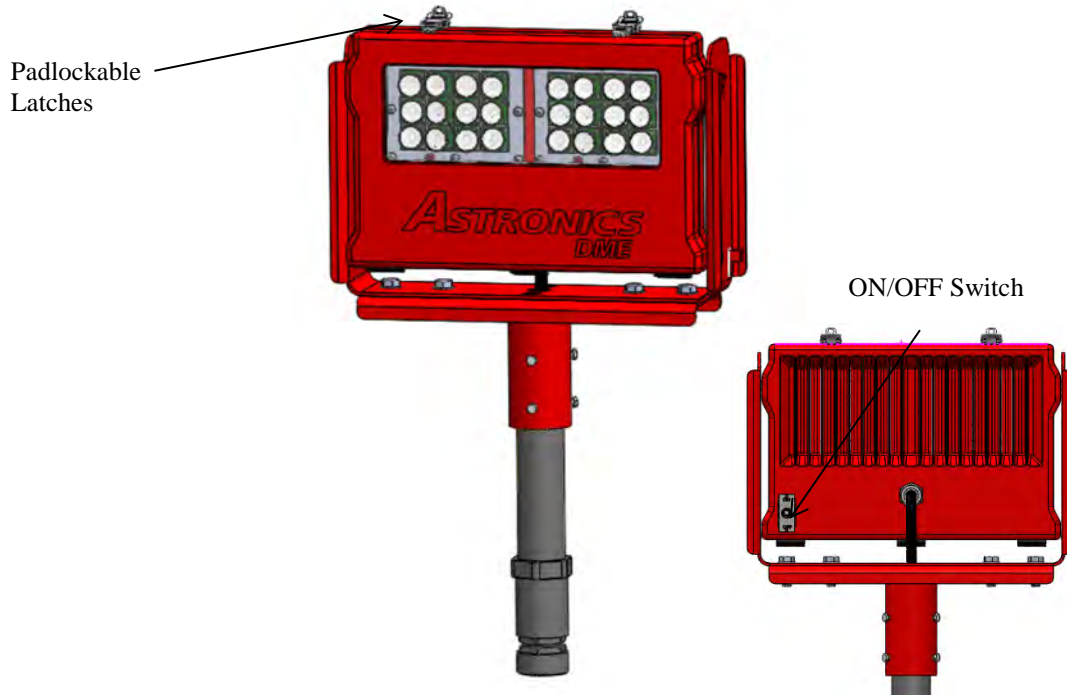


Figure 7-1 L-849I Latches & ON/OFF Switch

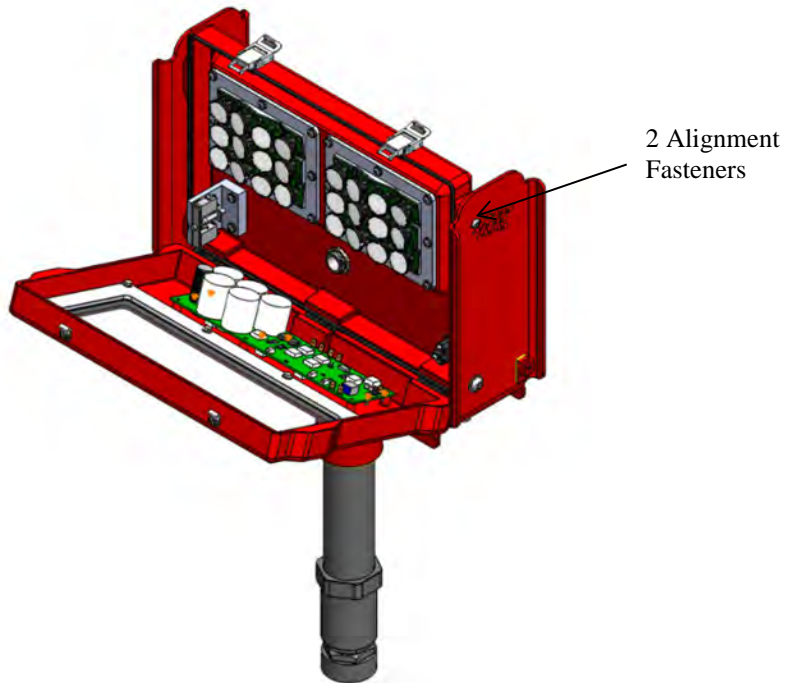


Figure 7-2 L-849I Opening

7.2.1.2 Closing

1. Inspect internal areas/components for any obvious damage. repair/replace as required.
2. Ensure wiring is properly positioned in IUA.
3. Slowly rotate the front of the IUA up to close the IUA, ensuring there is no interference of the wiring to the case.
4. Latch Padlockable latches.
5. If removed, install 2 alignment fasteners and torque to 72 in-lbs.
6. Install lock(s) if required.
7. If alignment was affected, perform alignment procedure per 3.4.3.
8. Perform Turn On and Checkout procedure per 4.2.3 and 4.2.5.

7.2.2. Driver PWA

See Figure 7-3, Figure 7-4 and Figure 7-5.

7.2.2.1 Removal

1. Gain access per 7.2.1.1

CAUTION

When removing and replacing the electronics module, handle with care to avoid damage to discrete components that can be caused by electrostatic discharge.

2. Remove wires from E3 and E4.
3. If Primary, remove wires from E5 and E6.
4. If Secondary, remove wires from E7 and E8.
5. Using wire removal tool, disconnect 2 wires from J2 and 2 wires from J3.
6. Remove 6 screws, shoulder washers from Driver PWA and remove Driver PWA from IUA. Remove 6 washers from the underside of the PWA.

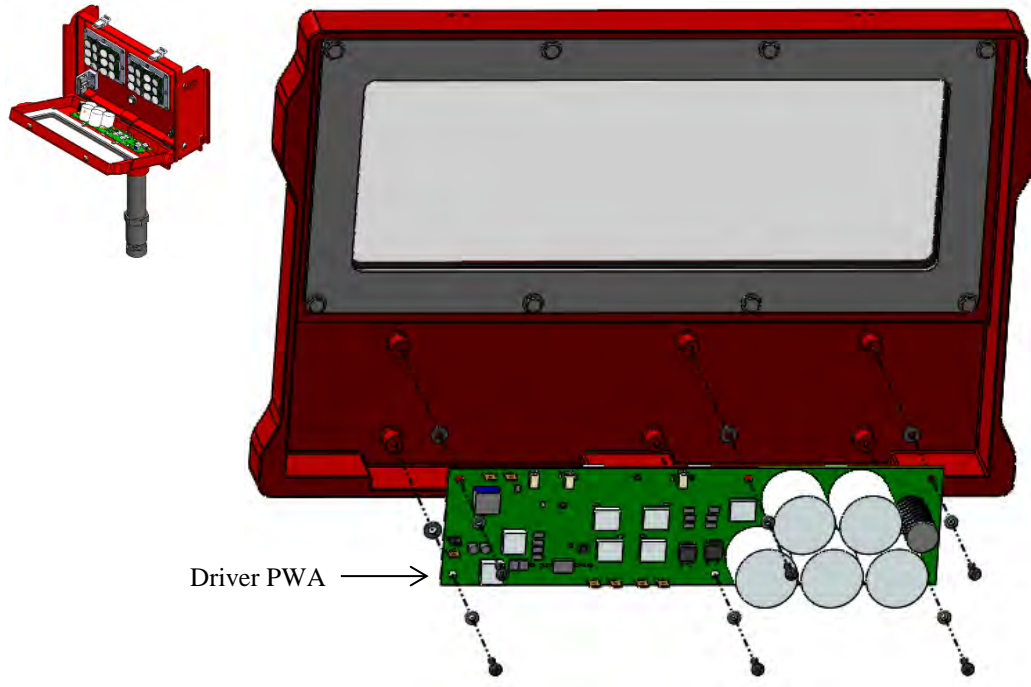


Figure 7-3 Driver PWA

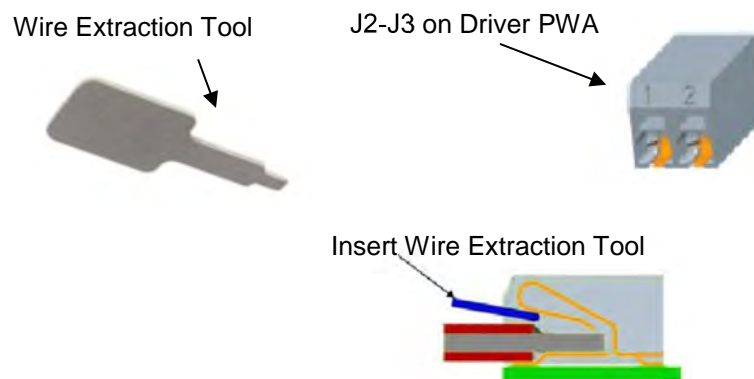


Figure 7-4 Wire Extraction Tool

7.2.2.2 Installation

1. Position 6 washers on studs.
2. Position Driver PWA over washers and studs.
3. Install 6 shoulder washers in Driver PWA mounting holes.
4. Hand tighten + ¼ turn.
5. For wiring details refer to Appendix B, Wiring Diagram
6. If **Secondary**, connect red wire 9a to E7 and connect orange wire 10a to E8. If **Primary**, connect red wire 9a to E5 and connect orange wire 10 to E6.

7. Connect black wire from the same Light Engine to Pin 2 on J2.
8. Connect red wire from other Light Engine to Pin 1 on J3.
9. Connect red wire from other Light Engine to Pin 2 on J3.
10. Ensure Dip Switches are set correctly per 7.2.4.
11. Close per 7.2.1.2

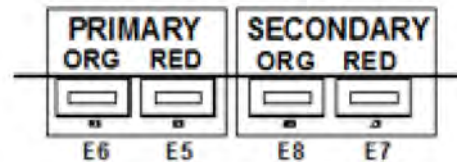
7.2.3 IUA Primary/Secondary Wiring

See [Figure 7-5](#).

7.2.3.1 Opening

1. Gain access per 7.2.1.1
2. Set IUA internal wiring as required for Primary or Secondary per [Figure 7-5](#).

	RED	ORANGE
PRIMARY	E5	E6
SECONDARY	E7	E8



A Primary & a Secondary IUA are required for proper system functionality.

Figure 7-5 IUA Internal Wiring – Sync Cable

7.2.3.2 Closing

1. Close per 7.2.1.2.

7.2.4 Dip Switch Settings

See [Figure 7-6](#) and [Figure 7-7](#).

7.2.4.1 Opening

1. Gain access per 7.2.1.1.
2. Set Dip Switches as required per [Figure 7-7](#) and [Figure 7-9](#).

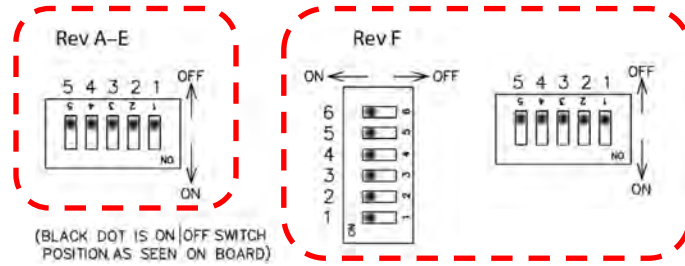


Figure 7-6 Driver PWA DIP Switch Options

Rev A–E: PRIMARY DIP SWITCH SETTINGS						
CCR	Style	SW1-1	SW1-2	SW1-3	SW1-4	SW1-5
3-STEP	A	ON	OFF	ON	OFF	X
5-STEP	A	ON	ON	ON	OFF	X
3-STEP	C	ON	OFF	OFF	ON	X
5-STEP	C	ON	ON	OFF	ON	X
3-STEP	E	ON	OFF	OFF	OFF	X
5-STEP	E	ON	ON	OFF	OFF	X

Rev A–E: SECONDARY DIP SWITCH SETTINGS						
CCR	Style	SW1-1	SW1-2	SW1-3	SW1-4	SW1-5
3-STEP	A	OFF	OFF	ON	OFF	X
5-STEP	A	OFF	ON	ON	OFF	X
3-STEP	C	OFF	OFF	OFF	ON	X
5-STEP	C	OFF	ON	OFF	ON	X
3-STEP	E	OFF	OFF	OFF	OFF	X
5-STEP	E	OFF	ON	OFF	OFF	X

Figure 7-7 Rev A-E Primary/Secondary DIP Switch Settings

Rev F: DIP SWITCH SETTINGS						
CCR	SW2-1	SW2-2	SW2-3	SW2-4	SW2-5	SW2-6
1-STEP	ON	OFF	OFF	OFF	OFF	X
2-STEP	OFF	ON	OFF	OFF	OFF	X
3-STEP	OFF	OFF	ON	OFF	OFF	X
4-STEP	OFF	OFF	OFF	ON	OFF	X
5-STEP	OFF	OFF	OFF	OFF	ON	X

Figure 7-8 Rev F DIP Switch Settings

7.2.4.2 Closing

1. Close per 7.2.1.2.

7.2.5 Light Engine(s) Assembly

See Figure 7-9.

7.2.5.1 Removal

1. Gain access per 7.2.1.1.
2. Disconnect wires from Driver PWA J2 and J3, per 7.2.2.1, step 5.
3. Remove 8 screws and washers from Light Engine Assembly.
4. Remove Light Engine Assembly from IUA.

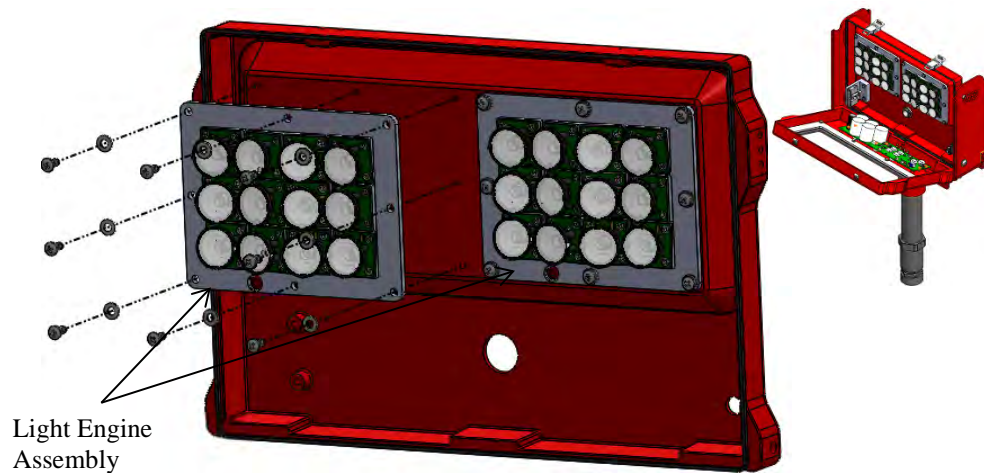


Figure 7-9 Light Engine Assembly

7.2.5.2 Installation

1. Position Light Engine Assembly (ensure the two frosted lens are at the outside edge of the unit) over mounting holes in IUA.
2. Install 8 screws and washers, hand tighten + ¼ turn.
3. Connect wires from Light Engine Assembly to Driver PWA J2 and J3, per 06, step 5 through 9.
4. Close per 7.2.1.2.

7.2.6 Glass Cover & Gaskets

See Figure 7-10.

7.2.6.1 Removal

1. Gain access per 7.2.1.1.
2. Remove 8 fasteners and washers.
3. Remove Lens Back Plate, Lens Gasket, Glass Cover and Front Gasket.

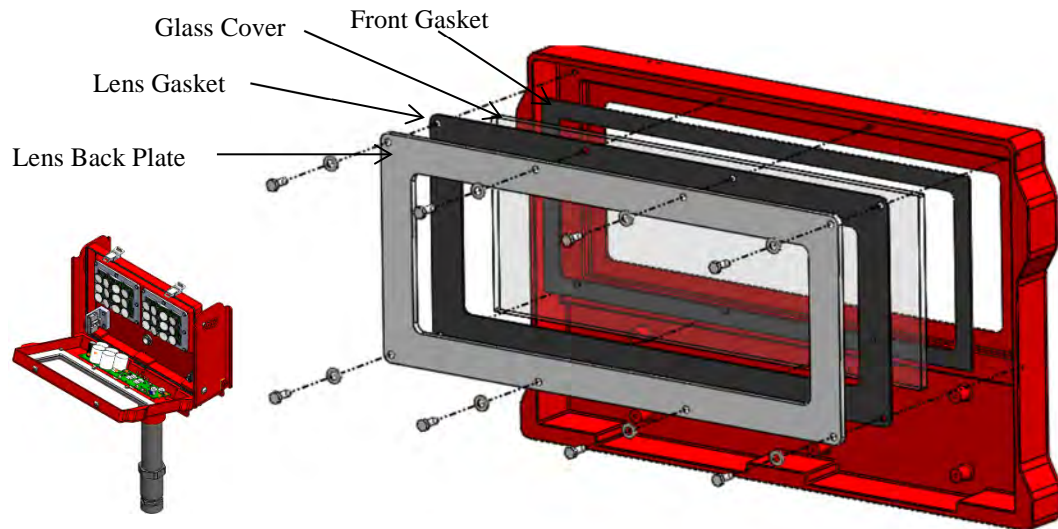


Figure 7-10 Glass Cover & Gaskets

7.2.6.2 Installation

1. Position Lens Back Plate, Lens Gasket, Glass Cover and Front Gasket over mounting holes in IUA.
2. Install 8 fasteners and washers, torque fasteners to 40 in-lbs.
3. Close per 7.2.1.2.

7.2.7 ON/OFF Switch & Guard

See Figure 7-11.

7.2.7.1 Removal

1. Gain access per 7.2.1.1.
2. If removing only ON/OFF Switch Guard, do steps 4 and 5.
3. Disconnect wires from switch.
4. Remove nut on back side of IUA.
5. Remove Switch Guard from back of IUA.
6. Remove ON/OFF Switch from inside of IUA.

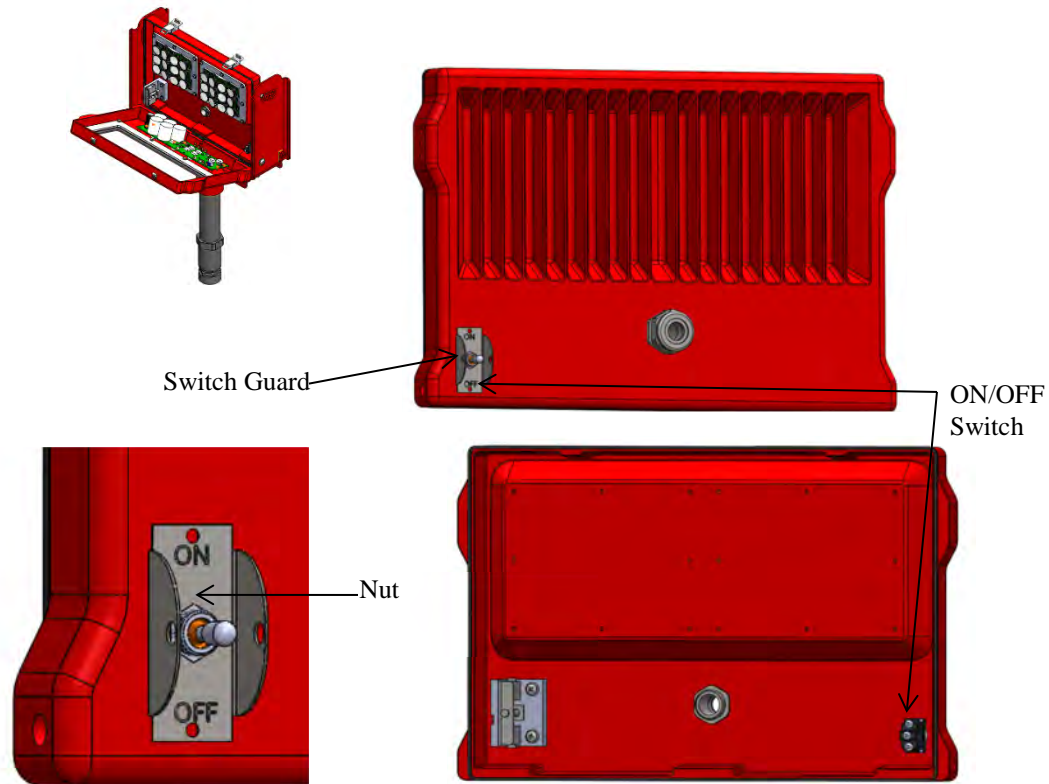


Figure 7-11 ON/OFF Switch & Guard

7.2.7.2 Installation

1. Position ON/OFF Switch through IUA from the inside (ensure the keyway is facing down).
2. Install Switch Guard over ON/OFF Switch and install nut, hand tighten + $\frac{1}{4}$ turn.
3. Connect wires per wire labels and Appendix B.
4. Close per 7.2.1.2.

7.2.8 Interlock Switch & Insulator

See [Figure 7-12](#).

7.2.8.1 Removal

1. Gain access per 7.2.1.1.
2. Remove 2 screws and washer from Insulator
3. Remove Insulator from IUA with Interlock Switch.
4. Remove 2 screws from side of Interlock Switch.
5. Remove Interlock Switch from IUA.
6. Disconnect wires.

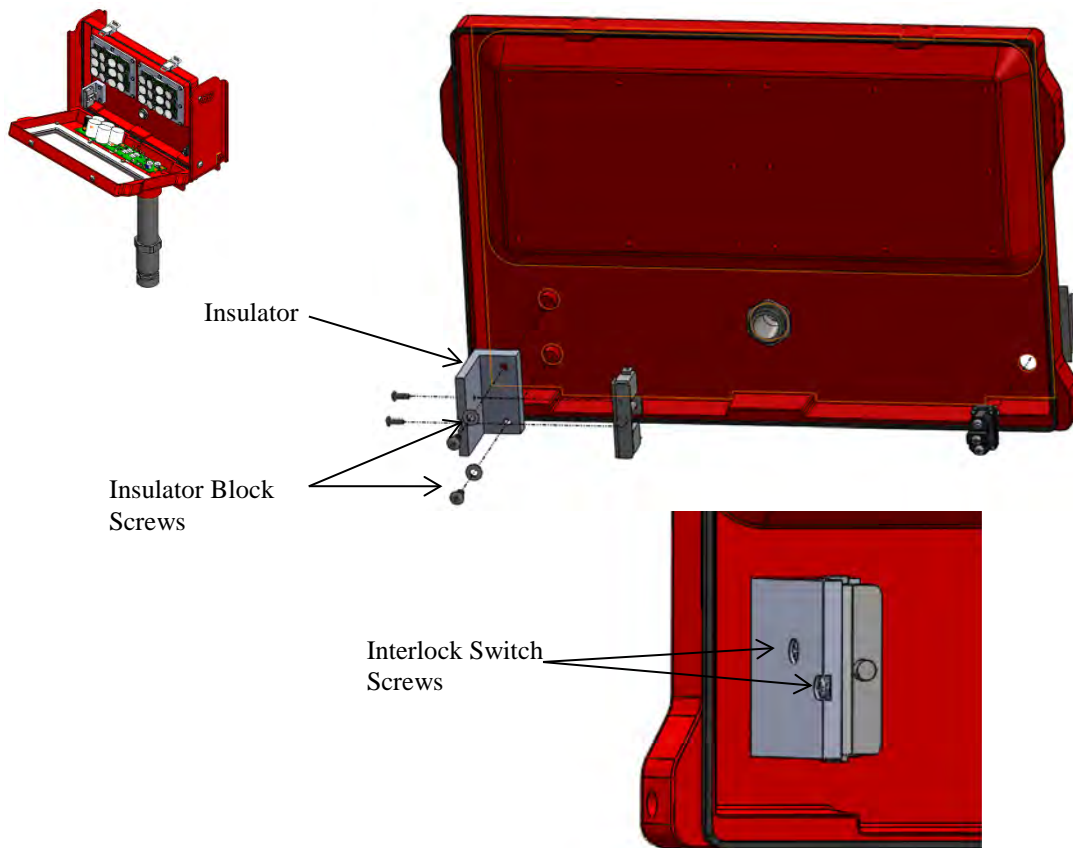


Figure 7-12 Interlock Switch & Insulator

7.2.8.2 Installation

1. Connect wires per wire labels and Appendix B.
2. Position Interlock Switch over holes on Insulator.
3. Install 2 screws through Insulator and hand tighten + ¼ turn.
4. Position Insulator over mounting holes.
5. Install 2 screws and washers, hand tighten + 1/4
6. Apply RTV over entire head of insulator block screws.
7. Close per 7.2.1.2.

7.2.9 Main Gasket

See Figure 7-13.

7.2.9.1 Removal

1. Gain access per 7.2.1.1.
2. Remove Main Gasket from around IUA.

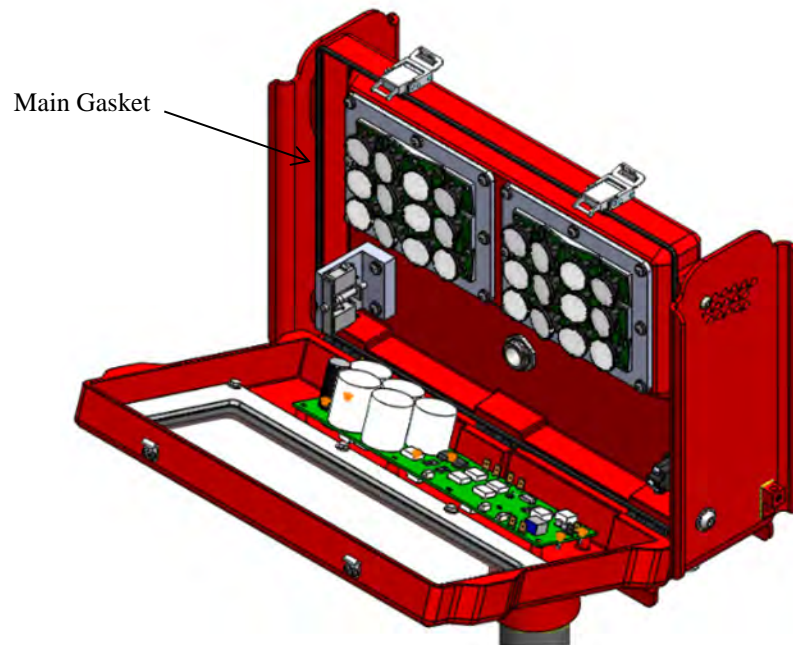


Figure 7-13 Main Gasket

7.2.9.2 Installation

1. Install new Main Gasket.
2. Close per 7.2.1.2.

7.2.10 Power Cable, Strain Relief, Frangible Coupling & EMT

See Figure 7-14.

7.2.10.1 Removal

1. Gain access per 7.2.1.1.
2. Disconnect wires from switch and PWA.
3. Loosen Strain Relief nut and pull over wires.
4. Pull L-823 5-Pin Power Cable through back side of IUA.
5. Temporarily close IUA and latch latches.
6. Loosen the six 1/4-20 set screws on the Frangible Coupling.
7. Unscrew Frangible Coupling from L-867 Base Plate and disconnect L-823 5-Pin Power Cable from L-823 5-Pin Adapter Cable in base can.
8. Pull L-823 5-Pin Power Cable up through the Frangible Coupling, EMT and Frame Assembly.

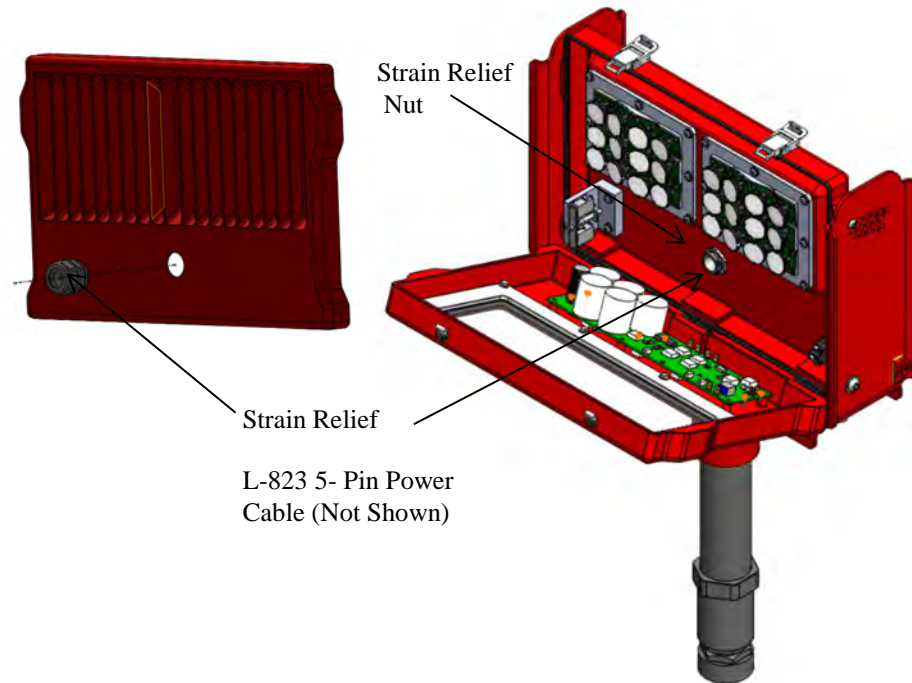


Figure 7-14 L-823 5-Pin Power Cable & Strain Relief

7.2.10.2 Installation

1. Route male end of L-823 5-Pin Power Cable down through the Frame Assembly, EMT and Frangible Coupling.
2. Connect L-823 5-Pin Power Cable to L-823 5-Pin Adapter Cable in base can.
3. Install Light Fixture over L867 Base Plate and screw in Frangible Coupling, torque to 40 ft.-lbs.
4. Tighten the six 1/4-20 set screws on the Frangible Coupling to the EMT, torque to 100 in.-lbs.
5. Open IUA latches.
6. Connect wires per wire labels and Appendix B.
7. Close per 7.2.1.2.

7.2.11 Padlockable Latch

See Figure 7-15.

7.2.11.1 Removal

1. Gain access per 7.2.1.1.
2. Remove 4 screws from Latch.
3. Remove Latch from IUA.

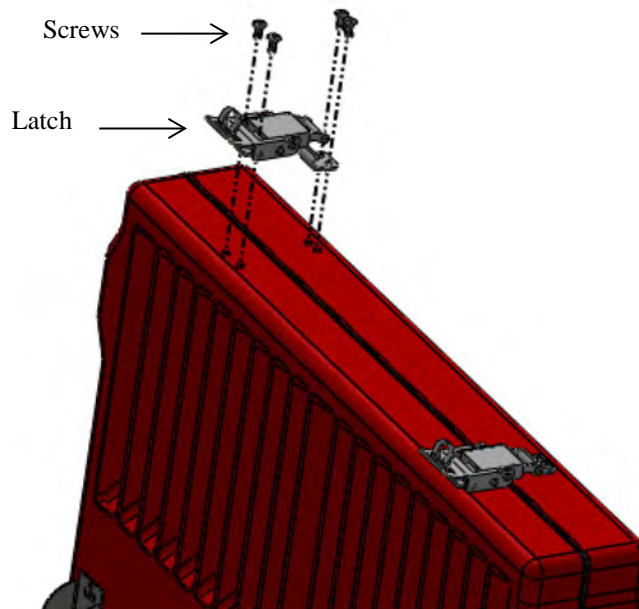


Figure 7-15 Padlockable Latch

7.2.11.2 Installation

1. Position Latch over mounting holes.
2. Install 4 screws, hand tighten + $\frac{1}{4}$ turn.
3. Close per 7.2.1.2.

7.2.12 IUA Hinge

See Figure 7-16.

7.2.12.1 Removal

1. Gain access per 7.2.1.1.
2. Remove 4 screws from Hinge.
3. Remove Hinge from IUA.

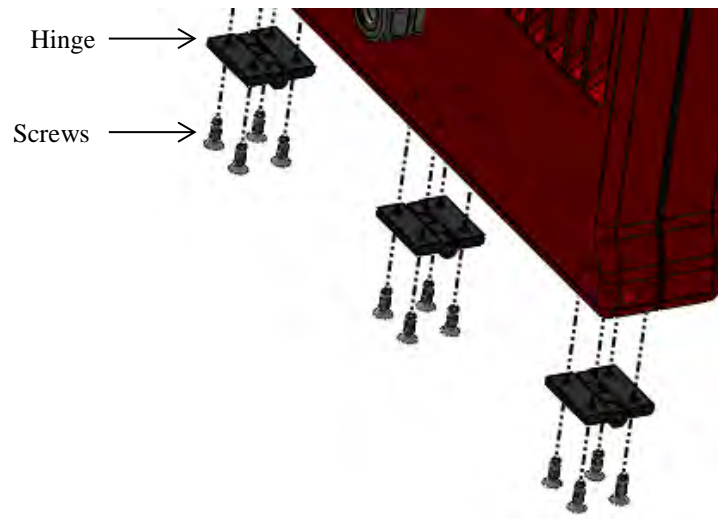


Figure 7-16 Hinge

7.2.12.2 Installation

1. Position Hinge of mounting holes.
2. Install 4 screws, hand tighten + $\frac{1}{4}$ turn.
3. Close per 7.2.1.2.

7.2.13 Glass Cover Cleaning

1. Gain access per 7.2.1.1.
2. Using soapy water, clean all moisture and dirt from the Glass Cover, inside and out.
3. Rinse with clean water to remove any soapy residue.
4. Close per 7.2.1.2.

8. PARTS

8.1 Introduction

This section of the manual contains the source data of all electrical and selected mechanical replacement parts of the L-849I REIL system, shown in Figure 8-1, Figure 8-2 and Table 8-1. Renewal parts are shown in Figure 8-1, Figure 8-2 and Table 8-2.

8.2 Name of Part and Description

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

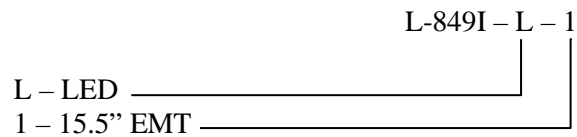
8.3 Part Number

This column gives the designation assigned to a component.

8.4 Ordering Information

Use the part numbering scheme in 8.4.1 to order the fixtures and the information in Figure 8-1. Use Table 8-2 to order renewal components.

8.4.1 L-849I REIL System



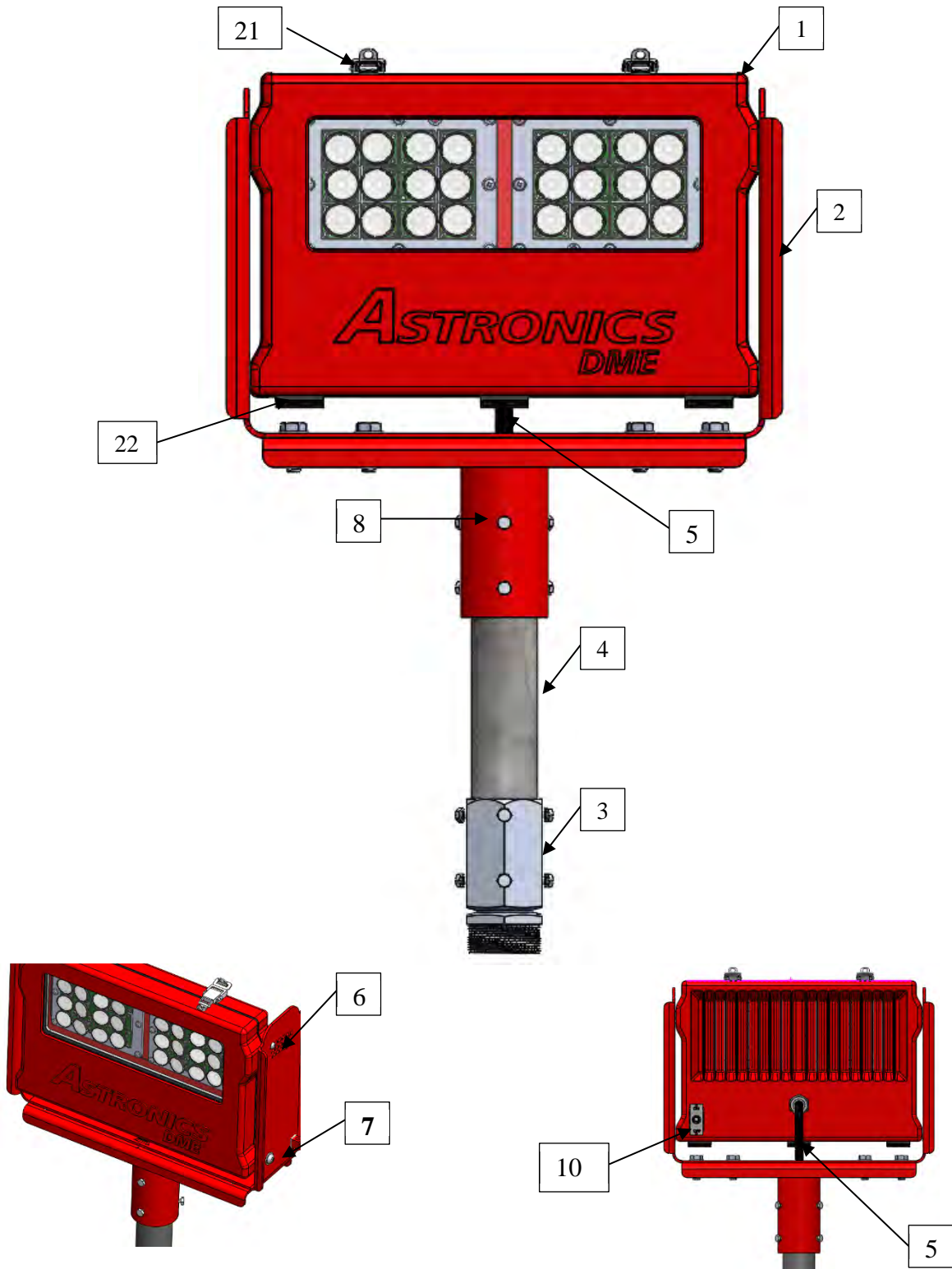


Figure 8-1 L-849I REIL System

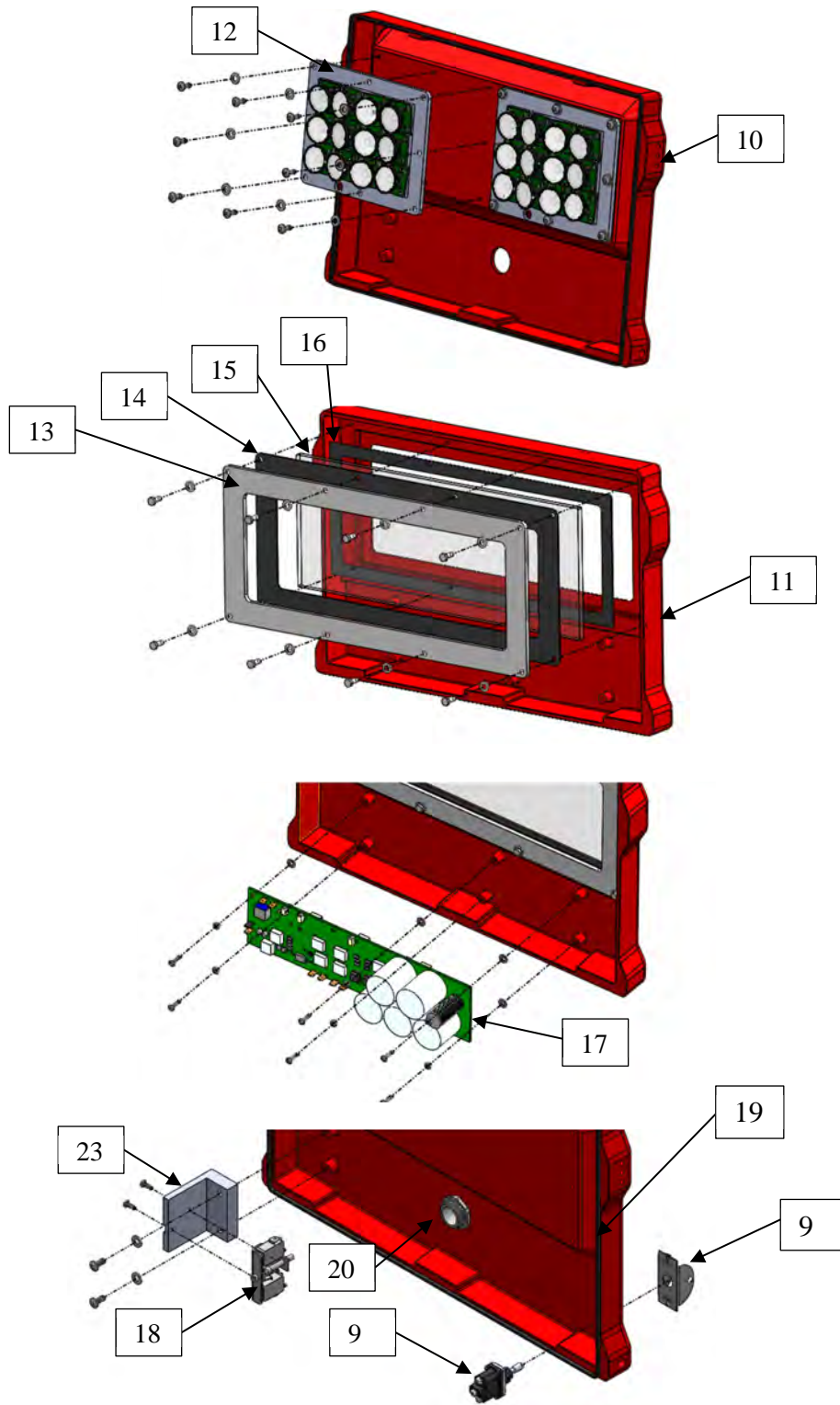


Figure 8-2 L-849I REIL System

Table 8-1 L-849I REIL System

Note: The following components and their part numbers are shown for reference only. Table 8-2 lists the renewal parts available for purchase.

Item	Part Name/Description	Part Number
Figure 8-1 Figure 8-2	L-849I-L-1	See para 8.4.1
REF	FINAL ASSY, AC REIL, L-849I	A3-06-3155-001
1	ASSY, IUA, AC REIL L-849I	A3-06-3157-001
2	ASSY, FRAME, AC REIL L-849I	A3-06-3156-001
3	FRANGIBLE COUPLING, REIL/PAPI	A1-17-1134-001
4	EMT, MODIFIED, YELLOW, 2", 15.5" LONG	A1-17-1047-002
5	L-823 CABLE ASSY, 5-PIN	A2-17-0027-001
6	SCREW, CAP, 1/4-20 X .500, SS	A1-05-0569-004
7	SCREW, CAP, 3/8-24 X .500, SS WASHER, FL, CRES, .406 x.812, .065 THK WASHER, FLAT, PVC, 1" OD X 7/16" ID, .05 THK	A1-05-0569-009 MS15795-814 A1-05-0587-001
8	SCREW, CAP, HEX, CRES, 1/4-20 x .500	MS35307-303
9	SWITCH, TOGGLE, DPDT, 15A, 277V SWITCH GUARD, TOGGLE	A1-12-0124-001 A1-12-0123-001
10	BACK CASTING, AC REIL L-849I	A1-17-1124-001
11	FRONT CASTING, AC REIL L-849I	A1-17-1125-001
12	ASSY, LIGHT ENGINE, AC REIL L-849I	A3-06-3116-002
13	LENS BACK PLATE, AC REIL L-849I	A1-17-1126-001
14	LENS GASKET, AC REIL L-849I	A1-25-0111-001
15	COVER, GLASS, L-849I	A1-32-0023-001
16	FRONT GASKET, AC REIL L-849I	A1-25-0112-001
17	PWA, DRIVER, L-849I REIL	A3-07-1147-001
18	SWITCH, INTERLOCK, SPDT, PUSH/PULL	A1-12-0108-001
19	MAIN GASKET, AC REIL L-849I	A1-25-0113-000
20	STRAIN RELIEF, SUBMERSIBLE	A1-05-0605-001
21	DRAW LATCH, PADLOCKABLE	A1-05-0604-001
22	HINGE, W/MOUNTING HOLES, SURFACE MOUNT	A1-05-0603-001
23	INTERLOCK INSULATOR, AC REIL L-849I	A1-18-2211-001

Table 8-2 L-849I REIL System Renewal Parts

Item	Part Name/Description	Part Number
Figure 8-1 Figure 8-2	REIL L-849I	SEE PARAGRAPH 8.4.1
	FINAL ASSY, AC REIL, L-849I	A3-06-3155-001
1	ASSY, IUA, AC REIL L-849I	A3-06-3157-001
2	ASSY, FRAME, AC REIL L-849I	A3-06-3156-001
3	FRANGIBLE COUPLING, REIL/PAPI	A1-17-1134-001
4	EMT, MODIFIED, YELLOW, 2", 15.5" LONG	A1-17-1047-002
Not Shown	L-823 POWER CABLE ASSY, 5-PIN	A2-17-0028-001
14,15,16	REPLACEMENT KIT, LENS, L-849I. Kit includes: LENS GASKET, AC REIL L-849I COVER, GLASS, L-849I FRONT GASKET, AC REIL L-849I WASHER, FL, CRES, .219 x.438, .049 THK (8) SCREW, PAN, PHH, CRES, #10-32 x.438 (8) MAIN GASKET, AC REIL L-849I	K1-02-0020-001
17,21	REPLACEMENT KIT, DRIVER PWA, L-849I. Kit includes: PWA, DRIVER, L-849I REIL MAIN GASKET, AC REIL L-849I SCREW, PAN, PHH, CRES, #6-32 x .500 (6) WASHER, SHLD, NYLON, .29 FL, .17 SHLD, .125 LG (6) WASHER, NYLON, #8 SCREW (6) WIRE EXTRACTION TOOL	K1-02-0021-001
19,20,21	REPLACEMENT KIT, TOGGLE SWITCH, L-849I. Kit includes: MAIN GASKET, AC REIL L-849I SWITCH, TOGGLE, DPDT, 15A, 277V SWITCH GUARD, TOGGLE O-RING, EPDM, .487" 10 x .693"00	K1-02-0022-001
18,21,25	REPLACEMENT KIT, INTERLOCK SWITCH, L-849I. Kit includes: SWITCH, INTERLOCK, SPDT, PUSH/PULL MAIN GASKET, AC REIL L-849I SCREW, PAN, PHH, CRES, #6-32X .375	K1-02-0023-001
12,21	REPLACEMENT KIT, LIGHT ENGINE, L-849I. Kit includes: ASSY, LIGHT ENGINE, AC REIL L-849I MAIN GASKET, AC REIL L-849I SCREW, PAN, PHH, CRES, #10-32 x.438 (8) WASHER, FL, CRES, .219 x.438, .049 THK (8) WIRE EXTRACTION TOOL	K1-02-0024-001
5,21,22	REPLACEMENT KIT, L-823 5-PIN CABLE ASSY, L-849I. Kit includes: L-823 CABLE ASSY, 5-PIN FLAG, QUIK DIS, INSUL (2) STRAIN RELIEF, SUBMERSIBLE MAIN GASKET, AC REIL L-849I TERMINAL LOCK FORK (2) TERMINAL LUG RING	K1-02-0025-001
21,23	REPLACEMENT KIT, DRAW LATCH, PADLOCKABLE, L-849I. Kit includes: DRAW LATCH, PADLOCKABLE (2) SCREW, PAN, PHH, CRES, #6-32 x .250 (8) MAIN GASKET, AC REIL L-849I	K1-02-0026-001
21,24	REPLACEMENT KIT, HINGE, L-849I. Kit includes: HINGE, W/MOUNTING HOLES, SURFACE MOUNT (3) SCREW, PAN, PHH, CRES, #6-32 x .250 (12) MAIN GASKET, AC REIL L-849I	K1-02-0027-001

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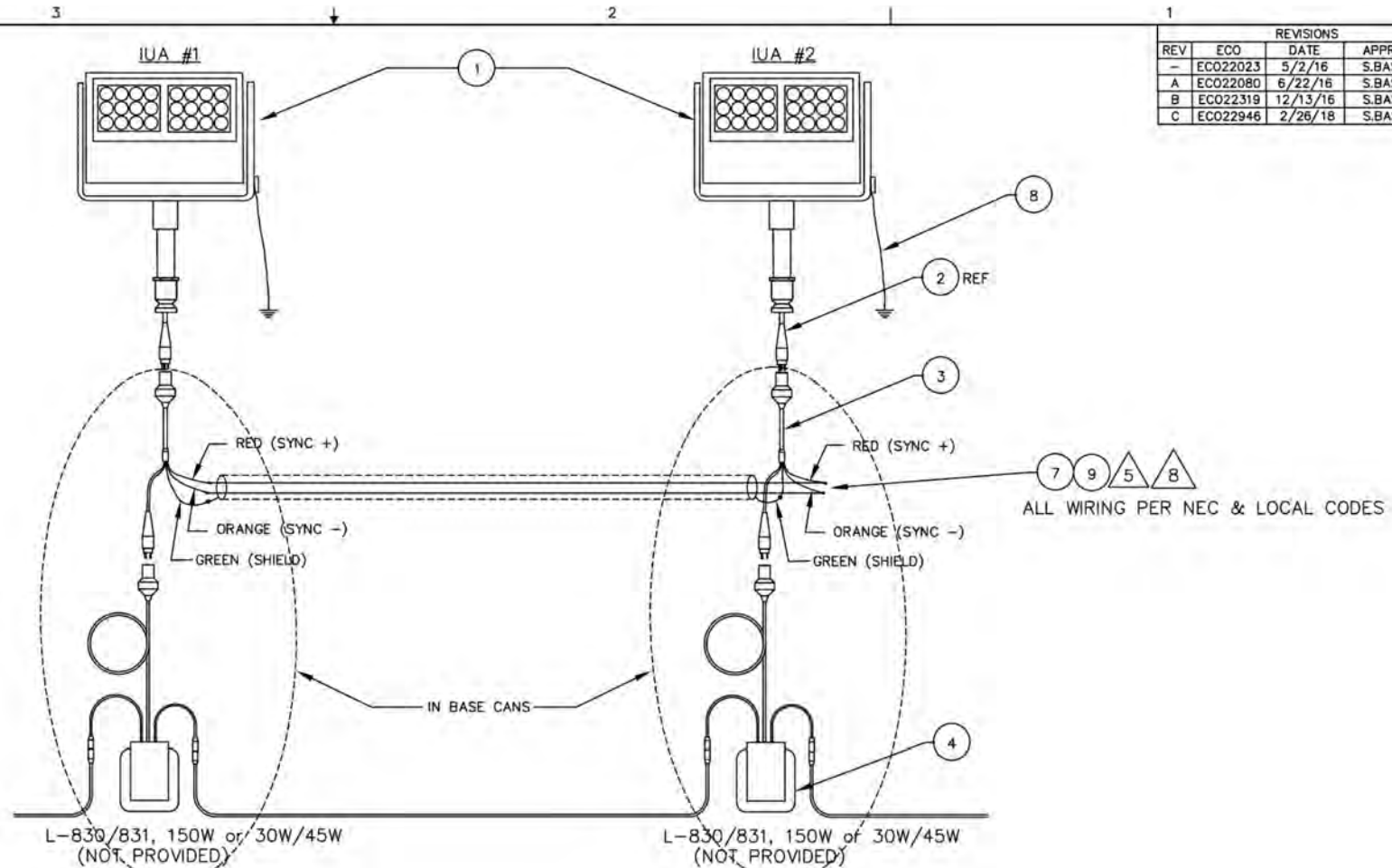
Appendix A Installation Drawings (w/Wiring Diagram)

NOTICE IS HEREBY GIVEN THAT ALL DATA CONTAINED IN, REVEALED BY, OR SHOWN IN THIS DOCUMENT ARE PROPRIETARY AND BELONGS TO ASTRONICS DME, FT LAUDERDALE, FLORIDA. IT IS FURNISHED AND RECEIVED IN CONFIDENCE SOLELY FOR INFORMATIONAL PURPOSES OF THE RECIPIENT FOR THE PURPOSES HEREWITH TRANSMITTED. NONE OF THE INFORMATION CONTAINED HEREIN SHALL BE USED FOR ANY OTHER PURPOSES OR DUPLICATED IN WHOLE OR IN PART WITHOUT PRIOR AUTHORIZATION OF ASTRONICS DME.

REVISIONS			
REV	ECO	DATE	APPROVAL
-	ECO22023	5/2/16	S.BASTIANI
A	ECO22080	6/22/16	S.BASTIANI
B	ECO22319	12/13/16	S.BASTIANI
C	ECO22946	2/26/18	S.BASTIANI

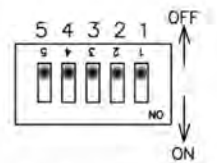
Notes:

1. GRAVEL/CONCRETE TO EXTEND 1" MAX. ABOVE ORIGINAL GRADE.
2. FOUNDATIONS FOR LIGHT UNITS SHALL BE FULL DEPTH FORMED, REINFORCED CONCRETE. TOP OF CONCRETE FOUNDATION SHALL BE 1"(INCH) MAXIMUM ABOVE FINISHED GRADE. BOTTOM OF CONCRETE FOUNDATION SHALL BE 3 FT. MINIMUM BELOW FINISHED GRADE OR 12" MINIMUM BELOW FROST LINE, WHICHEVER IS GREATER. CONCRETE SHALL BE 3000PSI (MIN 28 DAYS COMPRESSIVE STRENGTH). REINFORCING STEEL SHALL BE ASTM A615 GRADE 60. SEE ALSO FAA AC150/5370-10G.
3. FOR FURTHER DETAILS, SEE FAA AC 150/5340-30H, SECTION 7.4, AND FAA ORDER 6850.2 CHAPTER 4.
4. CABLE SHALL BE INSTALLED IN ACCORDANCE WITH APPLICABLE CABLE INSTALLATION STANDARDS.
5. SYNC CABLE SPLICES AND CABLE ENDS MUST BE SEALED.
6. UNLESS OTHERWISE NOTED ON SITE PLANS, THE IUAS SHALL BE AIMED 15 DEGREES OUTWARD FROM THE RUNWAY CENTERLINE AND 10 DEGREES ABOVE THE HORIZONTAL. FOR AIMING PURPOSES, CONSTRUCT A 24 INCH DIAMETER CONCRETE PAD 30 FEET ±10 FEET FROM THE IUA. EMBED A TWO INCH SCH 40 PVC CONDUIT AS SHOWN. PROVIDE 3' SEGMENT OF 1 1/2" PVC FOR ABOVE GROUND IDENTIFICATION.
7. P.K. (PARKER-KALON) NAILS SHALL BE INSTALLED ONTO THE CONCRETE FOUNDATION FOR THE REIL AT THE POINTS WHERE THE 15 DEGREE HORIZONTAL AIMING ANGLE INTERSECTS THE FOUNDATION AND IUA MOUNTING POLE.
8. SYNC CABLE MAXIMUM LENGTH 3000'.



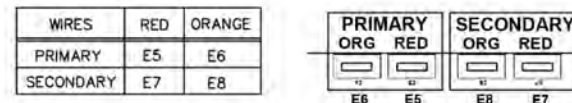
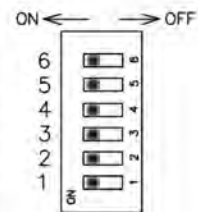
REIL SYSTEM WIRING DIAGRAM

SW1-	1	2	3	4	5
PRIMARY	ON	X	X	X	X
SECONDARY	OFF	X	X	X	X
3-STEP	X	OFF	X	X	X
5-STEP	X	ON	X	X	X
STYLE A	X	X	ON	OFF	X
STYLE C	X	X	OFF	ON	X
STYLE E	X	X	OFF	OFF	X
HEATER ENABLE	X	X	X	X	OFF
HEATER DISABLE	X	X	X	X	ON



(BLACK DOT IS SWITCH POSITION AS SEEN ON BOARD)

SW2-	1	2	3	4	5	6
STEP 1	ON	ON	X	X	X	X
FLASHING	OFF	OFF	X	X	X	X
STEP 2	ON	X	ON	X	X	X
FLASHING	OFF	X	OFF	X	X	X
STEP 3	ON	X	X	ON	X	X
FLASHING	OFF	X	X	OFF	X	X
STEP 4	ON	X	X	X	ON	X
FLASHING	OFF	X	X	X	OFF	X
STEP 5	ON	X	X	X	X	ON
FLASHING	OFF	X	X	X	X	OFF



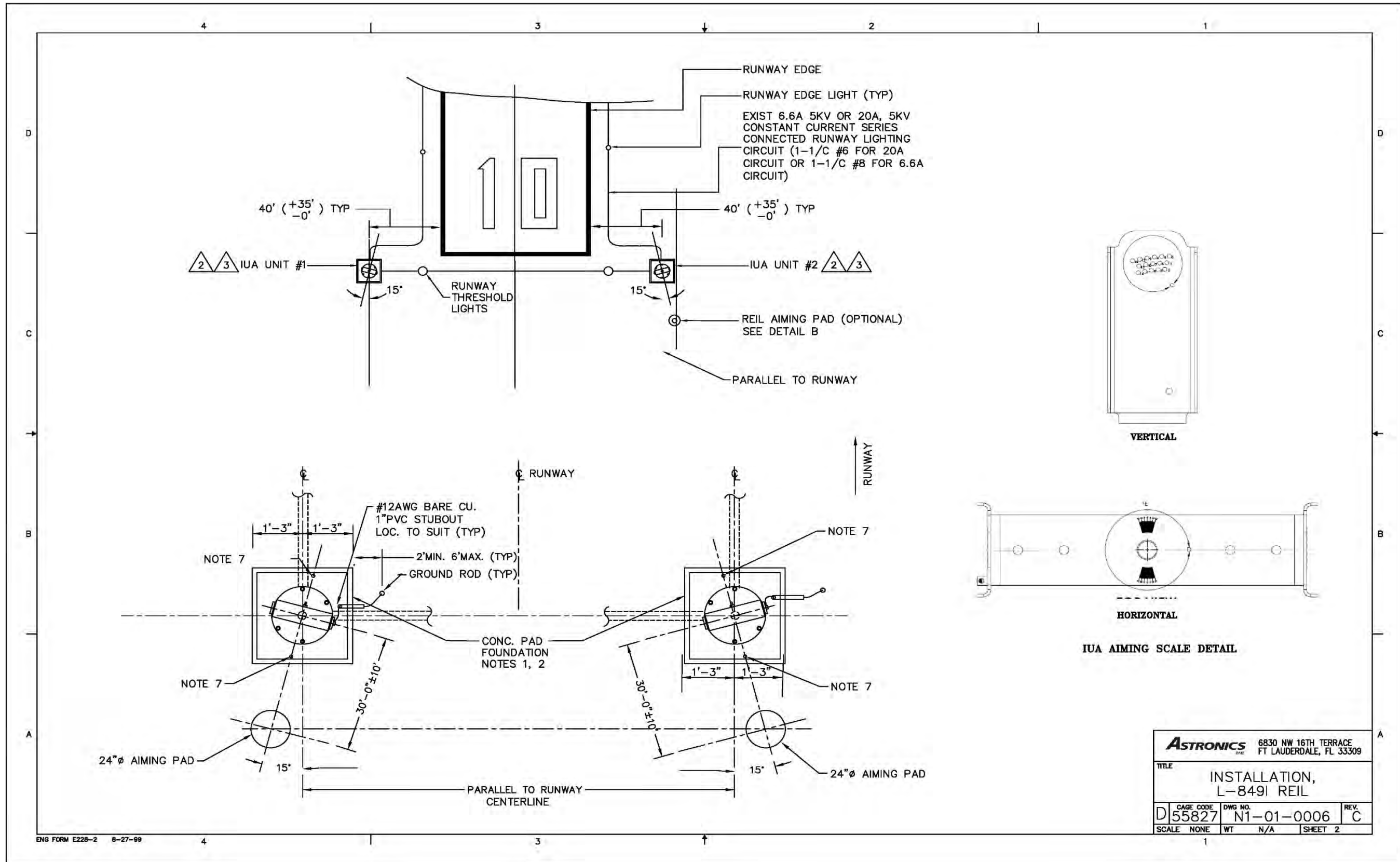
(ONE IUA MUST BE PRIMARY & ONE SECONDARY FOR PROPER SYSTEM FUNCTION)

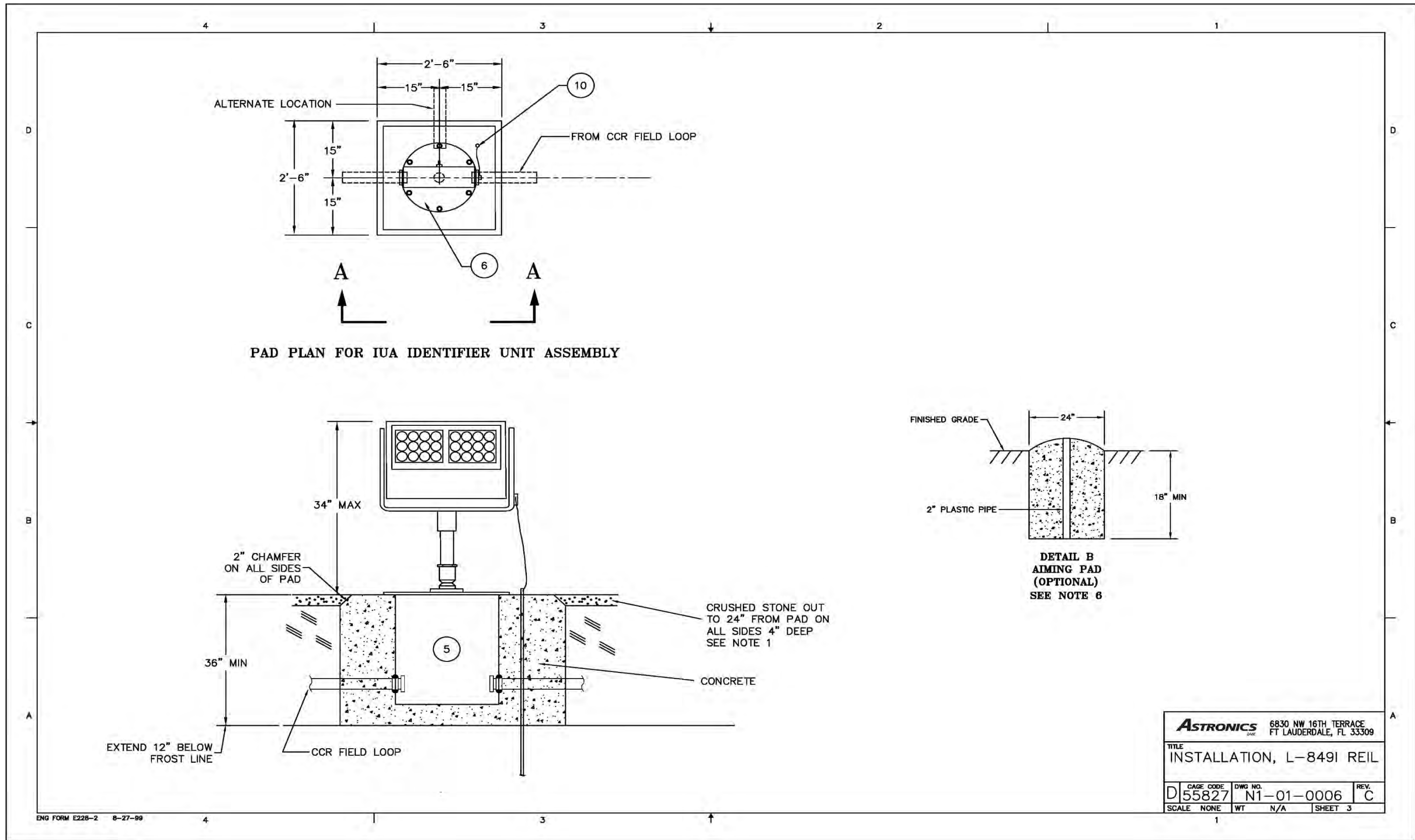
QTY REQUIRED	UNIT	DESCRIPTION	PART NO.	ITEM NO.
2	EA	GROUND ROD (NOT SUPPLIED)		10
6	EA	WATERPROOF SPLICES (NOT SUPPLIED)		9
A/R	A/R	#12 BARE SOFT DRAWN COPPER GROUND WIRE (NOT SUPPLIED)		8
A/R	A/R	SHIELDED TWISTED PAIR, #18 MINIMUM (NOT SUPPLIED)		7
2	EA	AP1935 BASEPLATE (NOT SUPPLIED)		6
2	EA	L867 LIGHT BASE CAN (NOT SUPPLIED)		5
2	EA	30W/45W ISOLATION TRANSFORMER (NOT SUPPLIED)		4
-	EA	150W ISOLATION TRANSFORMER (NOT SUPPLIED)		4
2	EA	CABLE, ADAPTER, 5-PIN (PART OF L-849I SYSTEM)		3
	EA	CABLE, 5-PIN, LB23 (PART OF IUA)		2
1	EA	L-849I REIL SYSTEM	L-849I-L-X	1

IUA CONFIGURATION - DIP SWITCH CHART

IUA INTERNAL WIRING - SYNC CABLE

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES		TOLERANCES ON 2 PLACE DECIMAL 3 PLACE DECIMAL	
±.03		±.010	
FRACTIONS ±1/8		ANGLES ±1°	
ASTRONICS 6830 NW 16TH TERRACE FT LAUDERDALE, FL 33309		TITLE: INSTALLATION, L-849I REIL	
CAGE CODE: 55827	DWG NO: N1-01-0006	REV: C	
SCALE: NONE	WT: N/A	SHEET 1 OF 3	





Appendix B L-849I AC REIL Wiring Diagram

