



Runway End Identifier Lights (REIL) L-849A (Style A)
L-849C (Style C), L-849E (Style E) Programming and
Configuration

User Manual

96A0008, Rev. X, 2018/09/11



A.0 Disclaimer / Standard Warranty

CE certification

The equipment listed as CE certified means that the product complies with the essential requirements concerning safety and hygiene. The directives that have been taken into consideration in the design are available on written request to ADB SAFEGATE.

ETL certification

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Note

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Note

See your sales order contract for a complete warranty description.

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- Failing to make sure that auxiliary equipment complies with approval agency requirements, local codes, and all applicable safety standards if not in contradiction with the general rules.
- Using materials or auxiliary equipment that are inappropriate or incompatible with your ADB SAFEGATE equipment.
- Allowing unskilled personnel to perform any task on or with the equipment.

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1.0 Safety

Introduction to Safety

This section contains general safety instructions for installing and using ADB SAFEGATE equipment. Some safety instructions may not apply to the equipment in this manual. Task- and equipment-specific warnings are included in other sections of this manual where appropriate.

1.1 Safety Messages

HAZARD Icons used in the manual

For all HAZARD symbols in use, see the Safety section. All symbols must comply with ISO and ANSI standards.

Carefully read and observe all safety instructions in this manual, which alert you to safety hazards and conditions that may result in personal injury, death or property and equipment damage and are accompanied by the symbol shown below.



WARNING

Failure to observe a warning may result in personal injury, death or equipment damage.



Danger - Risk of electrical shock or ARC FLASH

Disconnect equipment from line voltage. Failure to observe this warning may result in personal injury, death, or equipment damage. ARC Flash may cause blindness, severe burns or death.



WARNING - Wear personal protective equipment

Failure to observe may result in serious injury.



WARNING - Do not touch

Failure to observe this warning may result in personal injury, death, or equipment damage.



CAUTION

Failure to observe a caution may result in equipment damage.

Qualified Personnel



Important Information

The term **qualified personnel** is defined here as individuals 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. It is the responsibility of the company operating this equipment to ensure that its personnel meet these requirements.

Always use required personal protective equipment (PPE) and follow safe electrical work practice.

1.1.1 Introduction to Safety



CAUTION

Unsafe Equipment Use

This equipment may contain electrostatic devices, hazardous voltages and sharp edges on components

- Read installation instructions in their entirety before starting installation.
- Become familiar with the general safety instructions in this section of the manual before installing, operating, maintaining or repairing this equipment.
- Read and carefully follow the instructions throughout this manual for performing specific tasks and working with specific equipment.
- Make this manual available to 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.
- 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.
- Protect components from damage, wear, and harsh environment conditions.
- Allow ample room for maintenance, panel accessibility, and cover removal.
- Protect equipment with safety devices as specified by applicable safety regulations
- If safety devices must be removed for installation, install them immediately after the work is completed and check them for proper functioning prior to returning power to the circuit.

Failure to follow this instruction can result in serious injury or equipment damage

Additional Reference Materials



Important Information

- IEC - International Standards and Conformity Assessment for all electrical, electronic and related technologies.
- IEC 60364 - Electrical Installations in Buildings.
- FAA Advisory: AC 150/5340-26 (current edition), chapter 45, section 4, Maintenance of Airport Visual Aid Facilities.
- Maintenance personnel must refer to the maintenance procedure described in the ICAO Airport Services Manual, Part 9.
- ANSI/NFPA 79, Electrical Standards for Metalworking Machine Tools.
- National and local electrical codes and standards.

1.1.2 Intended Use



CAUTION

Use this equipment as intended by the manufacturer

This equipment is designed to perform a specific function, do not use this equipment for other purposes

- Using this equipment in ways other than described in this manual may result in personal injury, death or property and equipment damage. Use this equipment only as described in this manual.

Failure to follow this instruction can result in serious injury or equipment damage

1.1.3 Material Handling Precautions: Storage



CAUTION

Improper Storage

Store this equipment properly

- If equipment is to be stored prior to installation, it must be protected from the weather and kept free of condensation and dust.

Failure to follow this instruction can result in equipment damage

1.1.4 Operation Safety



CAUTION

Improper Operation

Do Not Operate this equipment other than as specified by the manufacturer

- Only qualified personnel, physically capable of operating the equipment and with no impairments in their judgment or reaction times, 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 starting 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.
- Protect equipment with safety devices as specified by applicable safety regulations.
- If safety devices must be removed for installation, install them immediately after the work is completed and check them for proper functioning.
- Route electrical wiring along a protected path. Make sure they will not be damaged by moving equipment.
- 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.
- Never touch exposed electrical connections on equipment while the power is ON.

Failure to follow these instructions can result in equipment damage

1.1.5 Maintenance Safety



DANGER

Electric Shock Hazard

This equipment may contain electrostatic devices

- 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.

Failure to follow these instructions can result in death or equipment damage

1.1.6 Material Handling Precautions, ESD



CAUTION

Electrostatic Sensitive Devices

This equipment may contain electrostatic devices

- Protect from electrostatic discharge.
- Electronic modules and components should be touched only when this is unavoidable e.g. soldering, replacement.
- Before touching any component of the cabinet you shall bring your body to the same potential as the cabinet by touching a conductive earthed part of the cabinet.
- Electronic modules or components must not be brought in contact with highly insulating materials such as plastic sheets, synthetic fiber clothing. They must be laid down on conductive surfaces.
- The tip of the soldering iron must be grounded.
- Electronic modules and components must be stored and transported in conductive packing.

Failure to follow this instruction can result in equipment damage

1.1.7 Arc Flash and Electric Shock Hazard



DANGER

Series Circuits have Hazardous Voltages

This equipment produces high voltages to maintain the specified current - Do NOT Disconnect while energized.

- Allow only qualified personnel to perform maintenance, troubleshooting, and repair tasks.
- Only persons who are properly trained and familiar with ADB SAFEGATE equipment are permitted to service this equipment.
- An open airfield current circuit is capable of generating >5000 Vac and may appear OFF to a meter.
- Never unplug a device from a constant current circuit while it is operating; Arc flash may result.
- Disconnect and lock out electrical power.
- Always use safety devices when working on this equipment.
- Follow the recommended maintenance procedures in the product 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 ADB SAFEGATE replacement parts. Using unapproved parts or making unapproved modifications to equipment may void agency approvals and create safety hazards.
- Check the 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 airfield electrical equipment.

Failure to follow these instructions can result in death or equipment damage

2.0 L-849 REIL

This section describes the ADB Safegate L-849A/C/E Runway End Identifier Lights (REIL). The REIL consists of two unidirectional light units, one on each side of the runway. These light units flash twice a second to provide a visual indication to pilots of the runway threshold during an approach for landing.

2.1 About this manual

The manual shows the information necessary to:

- Install and maintain the REIL C, A and E.

2.2 How to work with the manual

1. Become familiar with the structure and content.
2. Carry out the actions completely and in the given sequence.

3.0 Introduction

See [Figure 1](#) . This section describes the ADB Safegate L-849A/C/E Runway End Identifier Lights (REIL). The REIL consists of two unidirectional light units, one on each side of the runway. These light units flash twice a second to provide a visual indication to pilots of the runway threshold during an approach for landing.

3.1 Compliance with Standards

FAA : L-849 Type V and I Style A, C and E, AC 150/5345-51 (Current Edition) ETL Certified

ICAO: Annex 14, Vol. 1, para. 5.3.8 .

3.2 Uses

Provides a visual indication to pilots of the runway threshold during an approach.

L-849V – Voltage-powered REIL (ETL Certified)

L-849I – Current-powered REIL

Style A – High-Intensity/Single-Step

Style C – Low-Intensity/Single-Step

Style E – High-, Medium-, and Low-Intensity/Three-Step

The L-849 Style C is recommended when maximum singlestep flashtube lamp life is desired.

The L-849 Style E is recommended for intermittent use, such as when activated by radio control.

Figure 1: L-849 REIL



Refer to [Table 1](#) for the three L-849 optical assembly styles.

Table 1: Optical Assembly Styles

REIL Version	Style	Optical Assembly Style
L-849A	A	Unidirectional, high intensity
L-849C	C	Unidirectional, low intensity
L-849E	E	Unidirectional, low, medium, high intensity

3.3 Theory of Operation

This subsection describes the REIL theory of operation.

The L-849 REIL capacitive discharge-type flashing light system provides a visual indication of the runway threshold to pilots during an approach for landing. The system is composed of two sequenced flashers that operate simultaneously to produce short-duration flashes twice a second. Each optical assembly is composed of an optical head (xenon flash tube) and individual control cabinet.

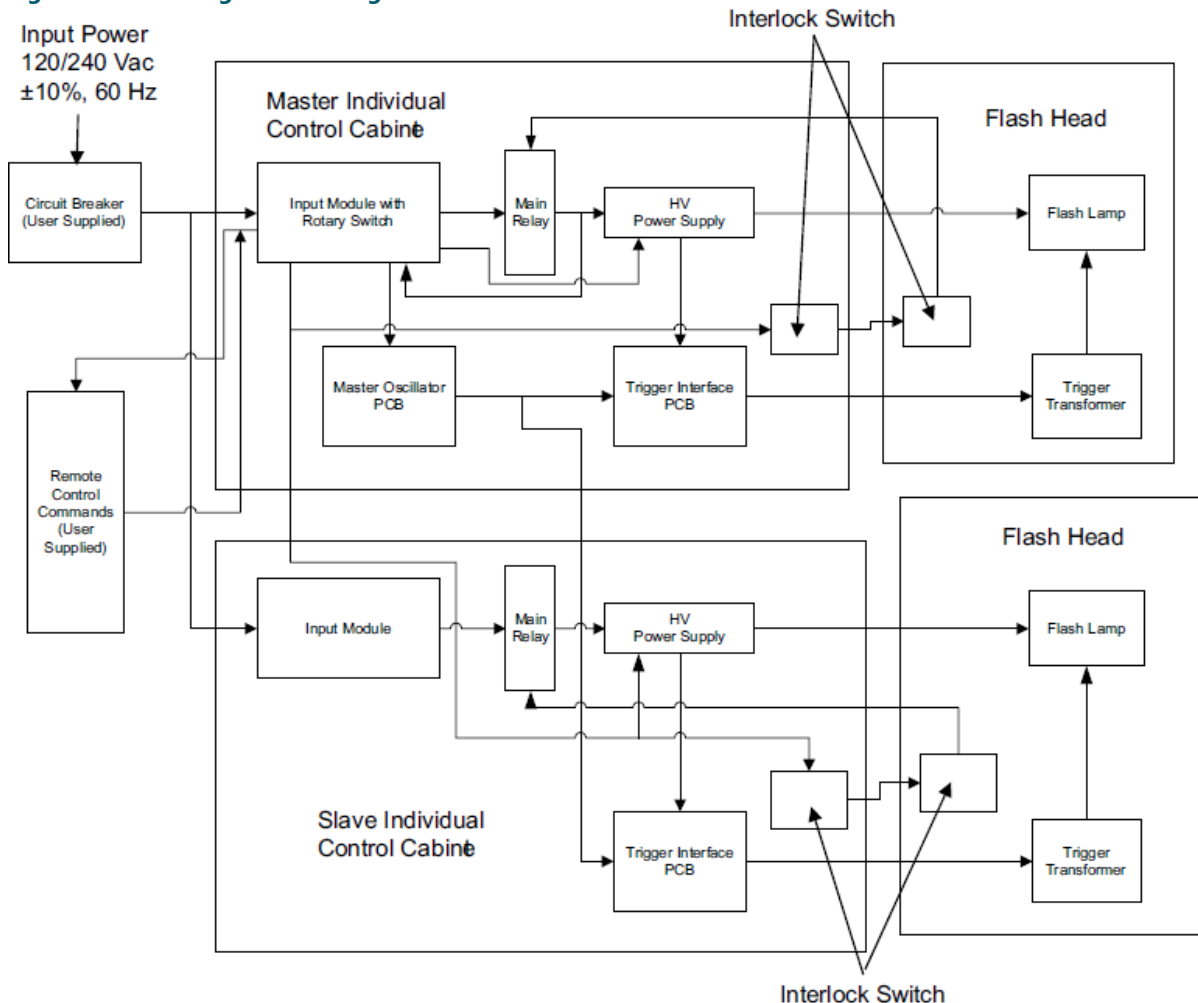
The REIL system may be operated either by local or remote control. The L-849A operates at high intensity, the L-849C at low intensity, and the

L-849E at low, medium, and high intensities. The system operates from a 120/240 Vac power supply or from a 6.6 A series circuit with an optional power adapter.

3.4 Overview

See [Figure 2](#). The L-849A and L-849C REIL systems consist of one master individual control cabinet with flash head and one slave individual control cabinet with flash head.

Figure 2: Block Diagram Showing L-849 REIL Power Flow



Input power comes from a customer-supplied external circuit breaker that is input into the input module on both the master and slave. The input module provides power to the high voltage (HV) power supply through the main relay in both master and slave and to the master oscillator printed circuit board (PCB). The high voltage power supply generates 2000 Vdc that charges up a power capacitor and then is discharged through the xenon flash lamp at the appropriate time.

Another output from the high voltage power supply provides a reduced DC voltage to charge a triggering capacitor in the trigger interface PCB. The master oscillator PCB produces low voltage trigger pulses in parallel to both trigger interface PCBs.

For remote control for the L-849A/C only, the master oscillator PCB in the master provides 120 Vac to the remote control device that powers the externally generated intensity commands. The remote control ON command voltage is taken through both interlocks (in the individual control cabinet and flash head) in both cabinets (master and slave) to energize the main relay to turn the unit on.

For remote control for the L-849E only, the rotary switch assembly in the master provides 120 Vac to the remote control device. The remote control device powers the externally generated intensity commands. Remote control commands are input into the rotary switch assembly. The rotary switch assembly generates both ON and intensity commands using either local or remote voltage. The ON-command voltage is taken through both interlocks in the individual control cabinet and flash head in both master and slave cabinets to energize the main relay to turn on the unit. The intensity commands from the Input Module are taken to both HV power supplies to allow one or more capacitors to be charged up.

For L-849A/C/E, when a given trigger pulses from the master oscillator PCB, the trigger interface PCB together with the trigger transformer in the flash head generate a high voltage trigger pulse that is placed on a wire wrapped around the outside of the xenon flash lamp. This high voltage ionizes the xenon gas inside the lamp, causing the lamp to have a low resistance to current flow.

At this time the power capacitor in the high voltage power supply discharges through the lamp, producing a bright flash. Immediately after the flash, the flash lamp has a high resistance to current flow (since the triggering voltage is not present) and the power capacitor in the high voltage power supply charges up again.

3.5 Input Module

Input power arrives at terminal block TB1 terminals 1 (120 Vac), 2 (neutral) and 3 (120 V ac).

There should be 240 Vac measured between TB1 terminals 1 to 3. Varistors VR1 and VR2 protect the individual control cabinet and flash head from lightning transients. Both 120 V ac lines pass through 4-amp fuses and connect to separate wipers on switch S1. If S1 is closed (ON position), 120 Vac is present at S1 pins 1 and 4. For the

L-849A/C REILs, the 120 Vac at S1 pin 1 is input into the master oscillator PCB at terminal block pin 1 (TB4-1); for the L-849E REIL the 120 Vac at S1 pin is input into the rotary switch assembly at location A. This 120 Vac is used for the ON commands in both remote and local.

When main relay K1 is energized (as explained in *Rotary Switch S1 in ON Position* in this section) the individual control cabinet is turned on and 120 Vac is present at K1 pins 3 and 4. This turns on neon light DS1 for the

L-849A/C REILs and DS3 for the L-849E REIL, indicating that input voltage is present. This voltage is input into transformer T1 in the high voltage (HV) power supply through current-limiting resistor R1. Hourmeter M1 is also energized to indicate the number of hours the flash lamp has been on.

3.6 Master Oscillator PCB (Master Individual Control Cabinet Only)

When the main relay K1 is energized, 120 Vac is input into the master oscillator PCB from TB4-4 to TB4-5. This causes the master oscillator PCB to generate reset commands twice per second that is output from P10, TB4-10 (Reset) to P9, and TB4-9 (Reset Common). These reset commands are input into master trigger interface PCB at TB3-8 to TB3-7 and output to the slave at TB1-5 to TB1-6 for the L-849A/C REILs and to the slave at TB1-7 to TB1-8 for the L-849E REIL. The reset commands are then input into the slave trigger interface PCB at TB3-8 to TB3-7 through TB1-5 to TB1-6 for the L-849A/C REILs, and through TB1-7 to TB1-8 for the L-849E REIL. See [Figure 29](#).

3.7 HV Power Supply

Capacitor C1 reacts with the magnetics of ferro resonant transformer T1 to produce an output high voltage (1500 V ac) that is impervious to input voltage variations.

The AC high voltage output from the ferro resonant circuit is taken to a full-wave bridge rectifier consisting of diodes D1 to D4. The output of the bridge rectifier is approximately 2000 Vdc.

For the L-849A/C REILs, the 2000 Vdc charges up flash capacitor C2 through current-limiting resistor R12. For the L-849A, the value of the flash capacitor is 27 μ F and for the L-849C it is 2.5 μ F.

For the L-849E REIL, the 2000 Vdc charges up flash capacitor C4 through current-limiting resistor R14 and flash capacitors C3 and C2 (through R14). Capacitor C4 is always connected in the circuit but C2 and C3 are switched in or out by relays K1 and K2 in the HV power supply. Refer to [Table 2](#) to determine which capacitors are charged up in each intensity level for L-849E. When relay K1 or K2 is energized, neon lights DS1 or DS2 respectively are illuminated, resulting in a visual indication of the intensity command selected. The state of DS1 and DS2 is also given in [Table 2](#).

Table 2: Intensity Level Capacitors for L-849E Only

Intensity	HV Power Supply Relay Energized	Flash Capacitor(s) in Circuit	Neon Light(s) Illuminated
Low	None	C4	None
Medium	K2	C3 and C4	DS2
High	K1 and K2	C2, C3, and C4	DS1 and DS2

When power is turned off, resistors R1 to R10 discharge capacitor C2 (C4 for L-849E) to 50 volts in less than 30 seconds. As an additional safety feature, bleeder resistor R11 (R13 for L-849E) is permanently connected across the terminals of C2 (C4 for L-849E) and discharges it to 50 volts in less than 5 minutes when power is turned off. For L-849E only, bleeder resistors R11 to R12 discharge capacitors C2 and C3, respectively to 50 V in less than 30 seconds. Resistors R1 to R10 form a voltage divider network that inputs approximately +300 Vdc into the trigger interface PCB at TB3-1 to TB3-3.

3.8 Intensity Control

See [Wiring Schematics](#) on page 40. For the L-849A/C REILs, the 120 Vac is input into the master oscillator PCB at P1, and for the L-849E REIL, the 120 Vac is input into the rotary switch assembly at terminal A when S1 in the input module is closed.

3.9 L-849A/C Rotary Switch Positions

This section describes the L-849 A/C rotary switch positions.

3.9.1 Rotary Switch S1 in OFF Position

When rotary switch S1 is in the OFF position, no voltage is output from the master oscillator PCB.

3.9.2 Rotary Switch S1 in ON Position

The 120 Vac is output at P2 on the master oscillator PCB. This 120 Vac will turn both individual control cabinets on. The 120 Vac at TB4-2 is taken to interlock switch S2. If S2 is in the SERVICE position or the door is closed, 120 Vac is taken through TB2 terminal 4 and TB1 terminal 4 (in the flash head) to interlock switch S1.

If the face of the flash head is closed, 120 Vac is taken through TB1 terminal 3 and TB2 terminal 3 (in the individual control cabinet) to energize main relay K1. This allows the input voltage to pass through the contacts of K1, powering the master individual control cabinet. The 120 Vac is output from the master at TB1-4 and is input into the slave at TB1-4. The slave is then turned on in the same manner as previously described.

3.9.3 Rotary Switch S1 in REMOTE Position

The 120 Vac is output from the master oscillator PCB at P3 through fuse F2. Remote neutral is also switched at P6. The remote 120 Vac at TB1-7 along with the remote neutral at TB1-8 is output from the master to power the externally supplied remote control circuitry. A 150 W (maximum) load can be connected externally between TB1 terminals 7 and 8 in the master.

3.9.4 Remote ON Command

When the system is turned on remotely, the remote control circuitry connects TB1-7 to TB1-9 on the master. This may be done with switches or relay contacts. This voltage goes into door interlock switch S2 and turns on the master as described in *Rotary Switch S1 in ON Position in L-849A/C Rotary Switch Positions* in this section.



Note

120 Vac is output from the master at TB1-4 to turn on the slave as described in *Rotary Switch S1 in ON Position in L-849A/C Rotary Switch Positions* in this section.

3.10 L-849E Rotary Switch Positions

This subsection describes the L-849E rotary switch positions.

3.10.1 Rotary Switch S2 in OFF Position

When rotary switch S2 is in the OFF position, no voltage is output from the rotary switch assembly.

3.10.2 Rotary Switch S2 in Low Position

For the L-849E only, when the rotary switch S2 is in the LOW position, the 120 Vac is output at terminal C. This 120 Vac turns both individual cabinets on, which automatically results in a low flash intensity, since C4 is permanently connected in the circuit. The 120 Vac at terminal C is taken to interlock switch S2. If S2 is in the SERVICE position or the door is closed, 120 Vac is taken through TB2 terminal 4 and TB1 terminal 4 (in the individual control cabinet) to energize main relay K1. This allows the input voltage to pass through the contacts of K1, powering the master individual control cabinet.



Note

The 120 Vac is output from the master at TB1-4 and is input into the slave at TB1-4. The slave is then turned on in the same manner as described above.

3.10.3 Rotary Switch S2 in Medium Position

The 120 Vac is output at terminal C and turns on both individual control cabinets. Refer to

Rotary Switch S2 in Low Position in *L-849E Rotary Switch Positions* in this section. The 120

Vac is also output at terminal G. Terminal G energizes K2 in the HV power supply and neon light DS2 in the input module in the master. This connects HV common to C3 and adds its energy to C4 when the flash lamp flashes, producing the medium intensity.



Note

The 120 Vac is output from the master at TB1-5 and is input into the slave at TB1-5. Relay K2 is then energized in the slave.

3.10.4 Rotary Switch S2 in High Position

High Position The 120 Vac is output at terminal C and turns on both individual control cabinets. Refer to *Rotary Switch S2 in Low Position* in *L-849E Rotary Switch Positions* in this section. The 120 Vac is output at terminal G and switches C3 into the circuit in both individual control cabinets. Refer to *Rotary Switch S2 in Medium Position* in *L-849E Rotary Switch Positions* in this section. The 120 Vac is also output at terminal H. Terminal H energizes K1 in the HV power supply and neon light DS1 in the input module in the master. This connects HV common to C2 and adds its energy to C3 and C4 when the flash lamp flashes, producing high intensity.

3.10.5 Rotary Switch S2 in Remote Position

The 120 Vac is output from the rotary switch assembly at terminal B through fuse F1. This 120 Vac is output from the master at TB1-9 to power the externally supplied remote control circuitry. A 150 W (maximum) load can be connected externally between TB1 terminals 9 and 10 in the master.

3.10.6 Remote On/Low Command

When the On/Low is desired, the remote control circuitry connects TB1-9 to both TB1-11 and -12 in the master. The 120 Vac present at TB1-11 in the master turns on both individual control cabinets. Refer to *Rotary Switch S2 in Low Position* in *L-849E Rotary Switch Positions* in this section.

3.10.7 Remote Medium Command

When medium intensity is desired, the remote control circuitry connects TB1-9 to both TB1-11 and -12 in the master. The 120 Vac present in TB1-11 in the master turns on both individual control cabinets. Refer to *Rotary Switch S2 in Low Position* in *L-849E Rotary Switch Positions* in this section.

The 120 Vac present at TB1-12 in the master is input into the rotary switch assembly at terminal E. This outputs 120 Vac from terminal G. Terminal G energizes K2 in both individual control cabinets. Refer to *Rotary Switch S2 in Medium Position* in L-849E *Rotary Switch Positions* in this section.

3.10.8 Remote High Command

When high intensity is desired, the remote control circuitry connects TB1-9 to TB1-11 and – 12 in the master. The 120 Vac present at TB1-11 in the master turns on both individual control cabinets. Refer to *Rotary Switch S2 in Low Position* in L-849E *Rotary Switch Positions* in this section. The 120 Vac present at terminal 12 energizes K2 in both individual control cabinets. Refer to *Rotary Switch S2 in Medium Position* in L-849E *Rotary Switch Positions* in this section. The 120 Vac present at terminal 13 in the master is input into the rotary switch assembly at terminal F. This outputs 120 Vac from terminal H. Terminal H energizes relay K1 in the HV power supply in both individual control cabinets. Refer to *Rotary Switch S2 in High Position* in L-849E *Rotary Switch Positions* in this section.

3.11 Flashing of Flash Lamp

The primary of trigger transformer T1 in the flash head is connected to the trigger interface PCB through TB2-2 and TB1-2 (in the flash head) to produce a high voltage on the secondary twice per second. This high voltage ionizes the xenon gas in the flash lamp, making it easy for current to flow. Capacitor C2 (for L-849E, capacitor C2, C3, C4), having previously been charged up to 2000 Vdc by the high voltage power supply, discharges into the xenon flash lamp DS1 through inductor L1 (which limits the peak current through the lamp), producing a bright flash.

3.12 Master Oscillator PCB (L-849E Only)

For L-849E, the master oscillator PCB generates reset commands twice per second that is output to the trigger interface PCB.

When 120 Vac is present from P4 to P5, it is input into the primary of transformer T1. Varistor VR1 protects the master oscillator PCB from transients. Transformer T1 steps the input voltage down to 14 Vac. This AC voltage is rectified by full-wave bridge rectifier BR1, and filtered by capacitor C1. Resistor R1 discharges C1 when power is turned off.

The unregulated DC voltage present across C1 is input into integrated circuit IC1 (a +12 Vdc voltage regulator). The regulated +12 Vdc output from IC1 is filtered by C4. Fuse F1 protects against shorts on the output of the +12 Vdc power supply. When +12 V dc is present, red LED DS1 illuminates. The +12 Vdc powers oscillator U1, which outputs an oscillating DC voltage from P10 to P9. Every 0.5 seconds, the output of U1 is at +12 Vdc for 0.1 seconds. When this occurs, green LED DS2 illuminates.

3.13 Trigger Interface PCB

The trigger interface PCB converts low voltage trigger commands from the master oscillator PCB to a high voltage trigger pulse to ionize the xenon gas in the flash lamp. Approximately +300 Vdc is present from P1 to P3. This charges capacitor C2 (clamped to +15 Vdc by zener diode Z1) through resistors R2, R4 and diode D2.

Capacitor C1 also charges to approximately +300 Vdc. Resistor R3 is a bleeder resistor for C1 when power is turned off.

The low voltage trigger pulse (reset) is present from P8 to P7. The transistor in optocoupler U1 is turned on when +12 Vdc is present through current-limiting resistors R6 and R7. Varistor VR2 protects the input of the optocoupler against transients.

When U1 is turned on, transistor Q2 is turned on and C2 discharges through Q2, diode D4 and R5 into the gate of SCR Q1. This turns the SCR on, which discharges C1 through P4 into the trigger transformer T1 in the flash head. This causes a high voltage trigger pulse to be present at the secondary of the trigger transformer, ionizing the xenon gas in the flash lamp.

3.14 Power Adapter

The optional oil-filled (no PCBs) 6.6 A/20 A PA-4 power adapters are designed to convert the series circuit input power to a constant voltage of 240/120 Vac, single phase, 60-Hz power to supply the REIL. The PA-4 power adapter with the current sensing option eliminates the need for a separate L-830-1/L-830-2 transformer, since the transformer is built in the power adapter.

3.14.1 Current Sensing ON/OFF Control

This subsection describes the current sensing ON/OFF control.

3.14.2 Current Sensing (L- 849A/C)

See [Wiring Schematics](#) on page 40. Current from the series loop is brought from the master terminal block TB1-11 and TB1-12 via an L-830 transformer or from PA-4 current sensing lead J4. Refer to [Table 3](#) for isolation transformer requirements.

Table 3: Required Isolation Transformers

Circuit	Isolation Transformer Required	Note
6.6 A	L-830-1 (30/45 W, 6.6/6.6 A)	A
20 A	L-830-2 (30/45 W, 20/6.6 A)	

Note A: Not required if using a PA-4 power adapter that includes the current sensing optional lead J4.I

This current from the loop is then sent to the current sensing PCB, which converts the current to an output control signal. If the current in the loop is greater than the preset level (adjustable), the relay on the current sensing board is energized, which energizes and pulls in the main relay K1 via terminal block TB1-4 on the REIL, allowing the REIL to operate.

3.14.3 L-849E Current Sensing

See [Wiring Schematics](#) on page 40. Current from the series loop is brought from the master terminal block TB1-15 and TB1-16 via an L-830 transformer or from PA-4 current sensing lead J4. Refer to [Table 3](#) for isolation transformer requirements.

This current from the loop is then sent to the current sensing PCB, which converts the current to an output control signal. If the current in the loop is greater than the first preset level (adjustable), the first relay on the current sensing board is energized, which lights DS1 and energizes and pulls in the main relay K1 via terminal block TB1-11 on the REIL, allowing the REIL to operate. If the current in the runway loop is greater than the second preset level (adjustable), the second relay on the current sensing board is energized, which lights DS2 and energizes K2 on the high voltage section of the REIL, placing it on medium intensity. Finally, if the current in the runway loop is greater than the third preset level (adjustable), the third relay on the current sensing board is energized, which lights DS3 and energizes K1 on the high voltage section of the REIL, placing it on high intensity.

3.15 Optional Equipment

The L-849A/C/E REIL units come with several options: power adapter, hour meter, and current sensor.

3.15.1 Optional Power Adapter

If a separate supply transformer is not used and the runway current loop is 6.6 A/20 A, then a PA-4 power adapter must be installed to supply 120/240 Vac power to the REIL system. Refer to the *Parts* section for PA-4 power adapter options and part numbers.

3.15.2 Optional Hourmeter

An elapsed time meter is available to indicate the number of hours of lamp operation from 0.0 to 9999.9 hours (resettable). The optional meter is installed in both the master and slave cabinets and allows maintenance personnel to determine when it is time for lamp replacement.

3.15.3 Optional Current Sensor

The current sensor option is available for one-step on/off control for the

L-849A/C/E REILs and three-step current sensing (LOW, MEDIUM, HIGH) for the L-849E

REIL. The current sensor monitors the current level in the series lighting circuit and turns the REIL system on or off depending on the current level in the circuit. The predetermined current levels are factory-set, but can be adjusted by the potentiometers on the current sensor PCB. Remote control of the REIL using dedicated wiring is not possible when the current sensing option is used.

Note

For L-849E only, current sensing for runway interlock on/off or intensity change can be used on 6.6 A or 20 A series circuits with appropriate 6.6/6.6 A isolation transformers. When the runway lighting circuit is 20 A, a separate 120/240 Vac input is required to power the REIL system.

3.15.4 Lamps-Out Monitor

The lamps-out monitor monitors consecutive misfires of flashers and shuts down flashers when consecutive misfires reach a preset number (for example, 2, or 4, or 8, or 16).

Refer to [Table 3](#) for isolation transformer requirements.

3.16 L-849A/C/E REIL: Required Equipment

Refer to [Table 4](#) for required equipment that is supplied. Refer to [Table 5](#) for required equipment that is not supplied. Refer to the *Parts* section for ordering information.

Table 4: Required Equipment Supplied

Description	Quantity
Master control cabinet with flash head	1
Slave control cabinet with flash head	1
Instruction manual	1 per order

Table 5: Required Equipment Not Supplied

Description	Quantity
Wire, input power. Refer to Table 2-6 .	As required
Wire, remote control (AWG 16, minimum, 600 V)	As required
Wire, interconnection individual control cabinets (AWG 16, minimum, 600 V)	As required
Shielded cable (used only for Reset and Reset Common). Refer to "Wiring Schematics" on page 40.	As required
Remote control device	As required
Ground rods and AWG 6 solid copper ground wire	As required
External circuit breaker for 120/240 Vac input power	1
Base pads, cement for mounting cabinets	As required
Silicone grease for pipe thread installation	As required
Conduit elbow, 2-in.- (50.8 mm-) diameter	2
Conduit elbow coupling to attach frangible coupling to elbow	2
Base flange, 6 ¼-in-. (158.75-mm-) diameter. Not required if conduit elbow coupling is used. (62B0107)	2
L-867 base, 16-in.- (406.4-mm-) diameter. Connects to house transformer and power adapter, if used.	1
Power adapter for 120/240 Vac power from 6.6 A/20 A series circuit power supply	1
Isolation transformer, L-830-1, 30/45 W, 6.6 A/6.6 A for optional current sensor on 6.6 A circuit. Not required if PA-4 power adapter with the current sensing option is used.	1
Isolation transformer, L-830-2, 30/45 W, 20 A/6.6 A for optional current sensor on 6.6 A circuit. Not required if PA-4 power adapter with the current sensing option is used.	1
L-823 connector, male and female, kit	1
L-823 male connector	As required
Level	1
Padlocks for master and slave cabinets	2



Note

Table 6 provides distances for systems not using the power adapter option. If using the power adapter option, use AWG 12, 600 V.

Table 6: External Power AWG Wire Size

Distance from Transformer to Master Individual Control Cabinet		
L-849A Feet (Meters)	L-849C Feet (Meters)	Minimum AWG Wire Size
1400 (426.72)	2000 (609.6)	10
900 (273.92)	1300 (396.24)	12
600 (182.88)	800 (243.84)	14
400 (121.92)	500 (152.4)	16

3.17 Specifications

This subsection provides specifications for the L-849A/C/E REILs.

3.18 Input:

120/240 Vac, 10 %, single phase, 60 Hz

3.18.1 Power Rating:

Refer to Table 7 .

Table 7: Power Rating

Style	Power Rating
L-849A 600	W (maximum)
L-849C 400	W (maximum)
L-849E 600	W (maximum)

3.18.2 Brightness Step

Refer to Table 8 .

Table 8: Brightness Step

Style	Intensity
L-849A	Single step, high intensity
L-849C	Single step, low intensity
L-849E	Low, medium, high intensity

3.19 Flash Tube

48B0022

3.19.1 Average Life

1000 hours

3.19.2 Photometric Output

Photometric output is within a beam pattern of 10 degrees vertical by 30 degrees horizontal for each flasher (tolerance of 50% in effective intensity). The effective intensities are maintained when operated within the ambient temperature range of -55 to +55 °C (-67 to +131 °F) with an input voltage of 120/240 Vac 10%. Refer to [Table 9](#).

Table 9: Photometric Output

Style 60 Hz	High Intensity Candelas	Medium Intensity Candelas	Low Intensity Candelas
L-849A, 600 W	15,000	N/A	N/A
L-849C, 400 W	N/A	N/A	700
L-849E, 600 W	15,000	1500	300

3.20 Flash Rate:

90 30 flashes per minute with less than 1% misfiring (no consecutive skips) over average life.

3.21 Environmental Operating Conditions:

The environmental operating conditions include temperature, altitude, relative humidity, and wind.

3.21.1 Operating Temperature Range

-55 to +55 °C (-67 to +131 °F)

3.21.2 Wind

Velocities up to 150 knots (173 mph) (278 km/h).

3.21.3 Relative Humidity

0 to 100%

3.21.4 Altitude

Sea level to 10,000 ft (3000 m)

3.22 Dimensions:

24 x 20 x 21.75 inches (609.6 x 508 x 552.45 mm) (L x H x D)

3.23 Weight:

210 lb (95.3 kg) approximately

4.0 Installation



Warning

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

This section provides instructions for installing the L-849A/C/E Runway End Identifier Lights (REIL). Refer to the airport project plans and specifications for the specific installation instructions.

4.1 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 might lead to detection of equipment damage.

If you note any damage to any equipment, file a claim with the carrier immediately. The carrier may need to inspect the equipment.

4.2 Specific Site Information

Site information is provided in the airport project plans and specifications. The installation shall conform to the applicable sections of the National Electric Code and local codes.

Refer to the guidelines below when preparing the site.

- See [Figure 3](#) . Each REIL light unit should be placed in a line with the runway threshold at 40 feet (12.2 m) from the runway edge.
- See [Figure 3](#) . A tolerance of 100 feet (30.4 m) upwind and 30 Feet (9.1 m) downwind with respect to being in line with the threshold is permitted.
- The light units shall be equally spaced with respect to each other from the runway threshold. Always check the latest FAA Advisory Circular AC 150/5340-30 for proper location.
- The beam centerline of each light unit is aimed 15 degrees outward from a line parallel to the runway centerline and inclined at an angle of 10 degrees above the horizontal.

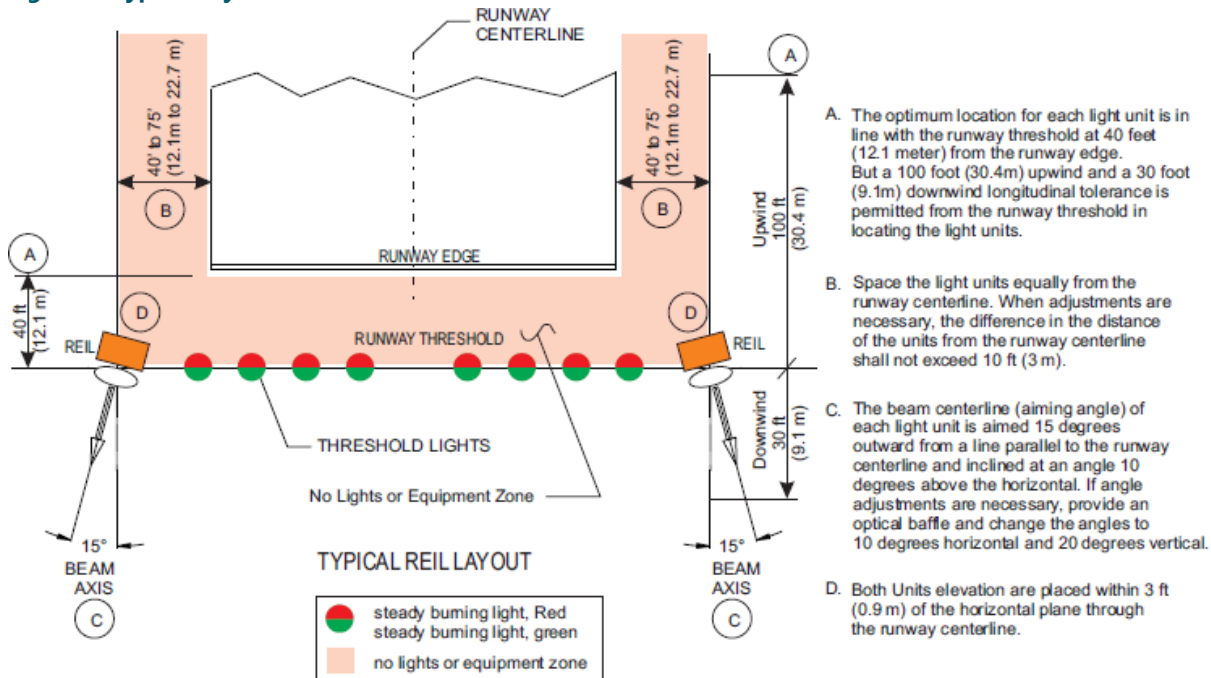


Note

If 15-degree beam axis is operationally objectionable, provide an optical baffle and change the angle to 10 degrees horizontally and 3 degrees vertically.

- If REILs are used with VASI-2, install REILs 75 feet from the runway edge.

Figure 3: Typical Layout for REIL



4.3 Tools and Test Equipment

Conventional tools and test equipment used by general and electrical contractors should suffice for installation. However, a multimeter such as a Simpson Model 260 or equivalent, a Simpson Model 362 low resistance ohmmeter or equivalent, a clamp-on instrument such as an Amprobe Model RS-1 or equivalent, and a true rms multimeter should be available. A waterproof shroud is needed if a cabinet door has to be opened in extremely inclement weather.

4.4 Installation of Master and Slave Cabinets

Unpack the individual cabinets, and loosen the bolts on the doors to open up the cabinets.



Note

The bolts do not come all the way out. They are permanently attached to the door and come loose only from the cabinet.

Make sure all major components of the master and slave units are in place and fastened to the panel assembly. The ON/OFF service switch in the master and slave cabinets should be in the OFF position. If all components are in place, close the door and tighten the bolts.

4.4.1 Mounting Option

See [Figure 4](#) through [Figure 8](#) for L-849A/C/E REIL mounting options. Only the L-849 kits for the single/dual leg standard mounting configuration are FAA approved.

i Note [Figure 4](#) shows the single leg standard mounting configuration. A dual-leg option is also available.

Figure 4: L-849 Kit (FAA-Approved Single Leg Standard Mounting Configuration)

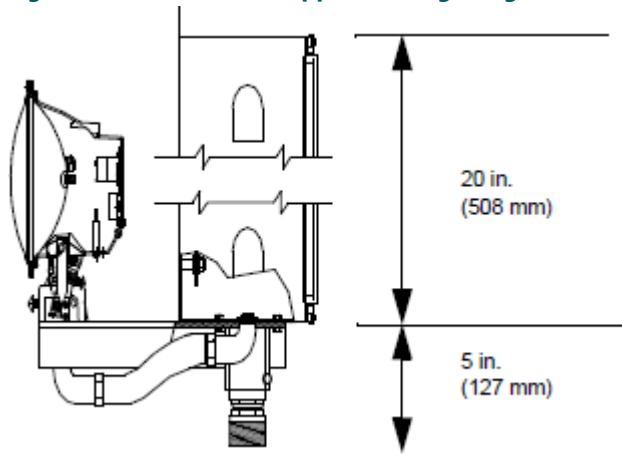
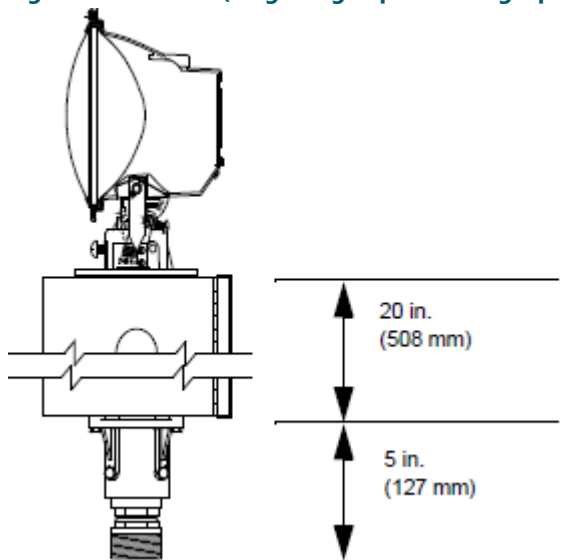


Figure 5: L-849 Kit (Single Leg Top Mounting Optical Lamp)



i Note The single leg top mounting optical lamp option exceeds FAA mounting height and is not ETL certified.

i Note [Figure 6](#) shows a dual-leg kit with head mounted on extension. [Figure 7](#) shows a single-leg with head mounted on extension. The dual-leg with head mounted on extension and single-leg top mount with extension exceed FAA mounting heights and are not ETL certified.

Figure 6: L-849 Kit (Dual Leg with Head Mounted on Extension)

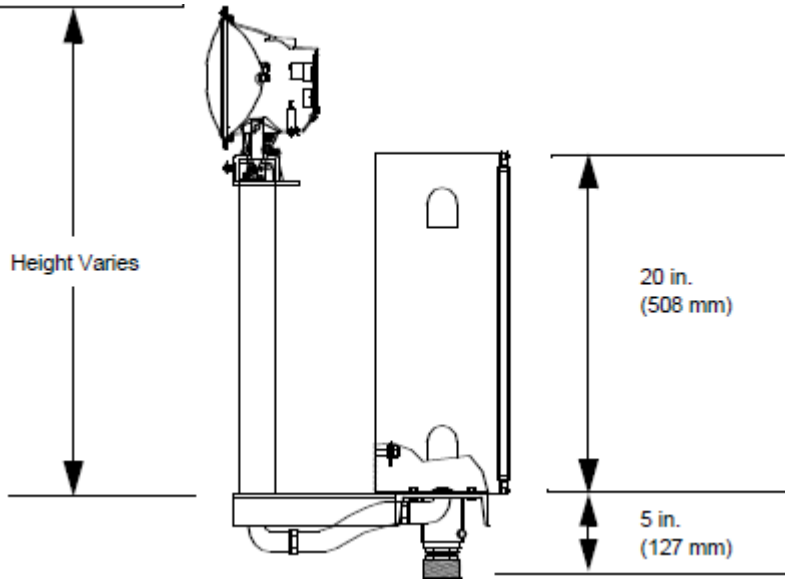
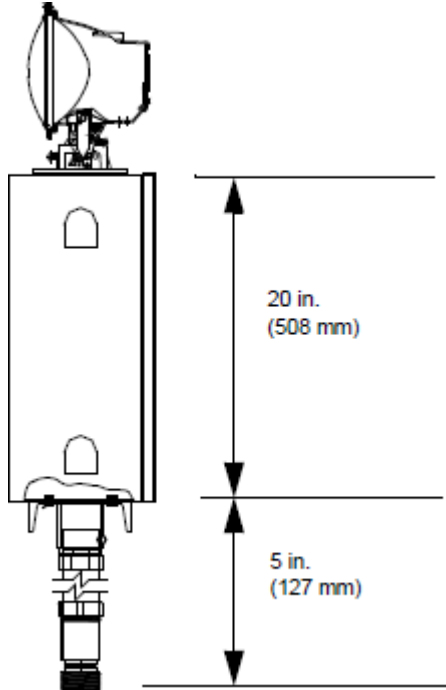


Figure 7: L-849 Kit (Single-Leg Top Mount with Extension)

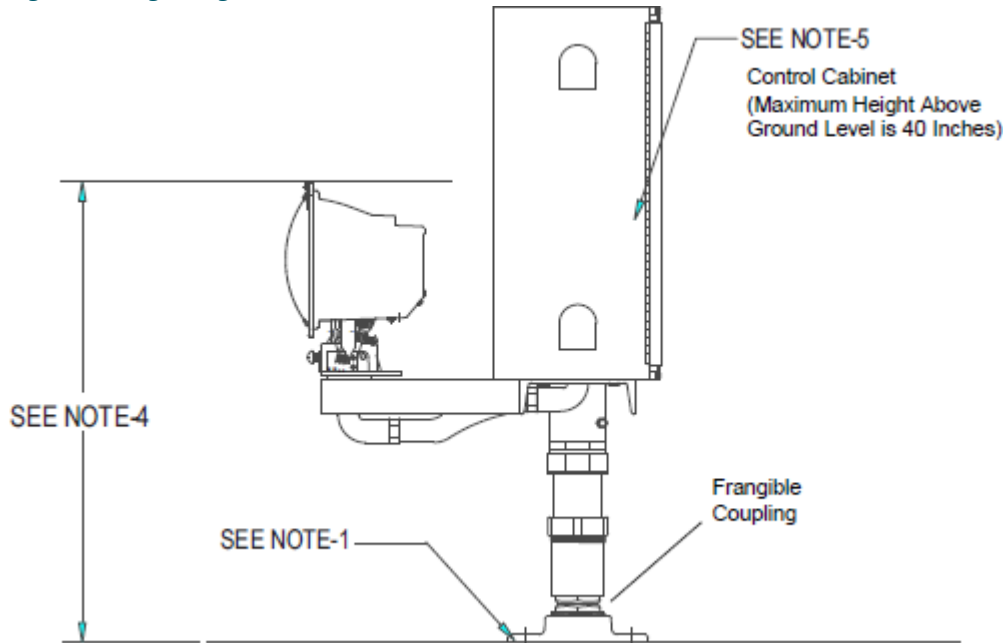


4.4.2 Mounting Cabinets

The master and slave cabinets are designed for mounting single-leg and dual-leg options on concrete pads as shown in Figure 8 and Figure 9 .

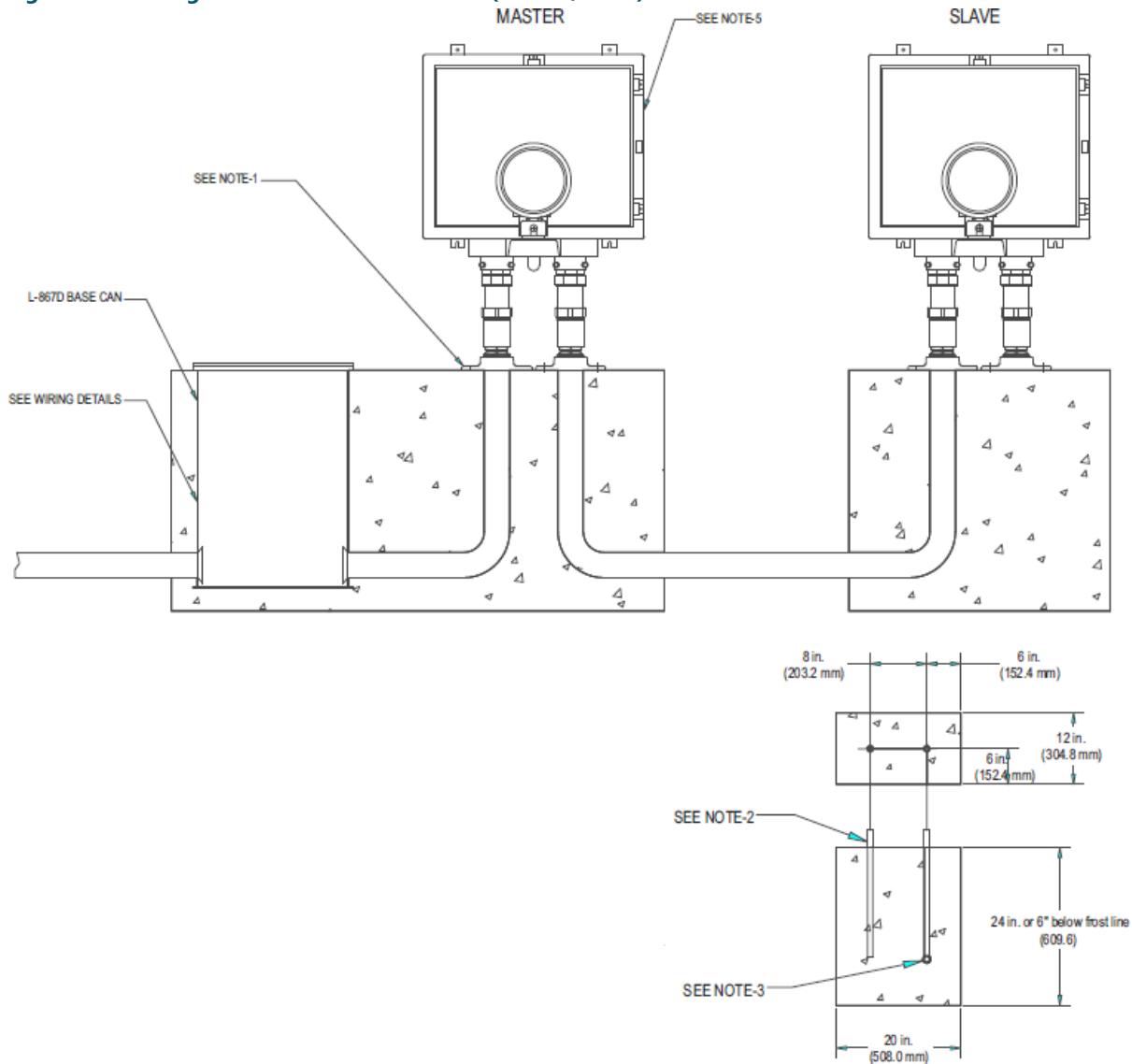
Note Figure 8 and Figure 9 are given only as guides. Check local codes and the airport project plans and specifications of installation requirements.

Figure 8: Single-Leg Individual Control Cabinet (Master/Slave)



- Note**
1. Optional base flange shown for reference only.
 2. Use Two-Inch Threaded Coupling if Flange Not Used.
 3. Use two-inch elbow for external wires.
 4. The overall height of the optical assembly shall not exceed 34-inches.
 5. ADB Safegate part 44D1161/XX.

Figure 9: Dual-Leg Individual Control Cabinet (Master/Slave)



Note

1. Optional base flange shown for reference only.
2. Use two-Inch Threaded Coupling if Flange Not Used.
3. Use two-inch elbow for external wires.
4. The overall height of the optical assembly shall not exceed 34 inches.
5. ADB Safegate part 44D1161/XX.

To install the master and slave cabinets, perform the following procedure:

Note

A customer-supplied external circuit breaker should be installed on the master cabinet for the 120/240 Vac input power supply lines.

1. Install a customer-supplied 2-inch (50.8 mm) conduit elbow in the concrete pad for external wiring routing into the bottom mounting hub of the cabinet.



Note

Height of concrete foundation should be 6 in. (152.4 mm) below frost line.

-
2. Install a customer-supplied 2-inch (50.8 mm) threaded coupling on the threaded end of the conduit elbow.



Note

Make sure the coupling is installed level and square with the concrete pad. Level by adjusting slip-fitters on pipe extending downward from cabinet. An alternate method is to use a 6 1/4-inch (158.75 mm) base flange, and bolt the flange to the concrete pad over the conduit elbow, flush with top of pad.



Note

When the base flange is used, make sure the flange can be installed level with the concrete pad. Use shims on the flange if further leveling of unit is required. Make sure the conduit is flush with the top of the concrete pad.

-
3. Coat the threaded end of frangible coupling with silicone grease and thread onto base flange or conduit elbow coupling.
 4. Loosen the hex head screws in the mounting hub and mount cabinet on frangible coupling.
 5. Place a level on the flash head support arm as indicated in [Figure 8](#).



Note

Level by adjusting slip-fitters on the pipe extending downward from the cabinet.

-
6. Tighten the hex head screws in the mounting hub against the frangible coupling when the flash head support arm is level.



Note

To properly aim the light unit, the flash head support arm must be level and parallel to the runway centerline when the master and slave cabinets are installed.

-
7. Tighten the hex head screws against the hub

4.5 Aiming Flash Heads

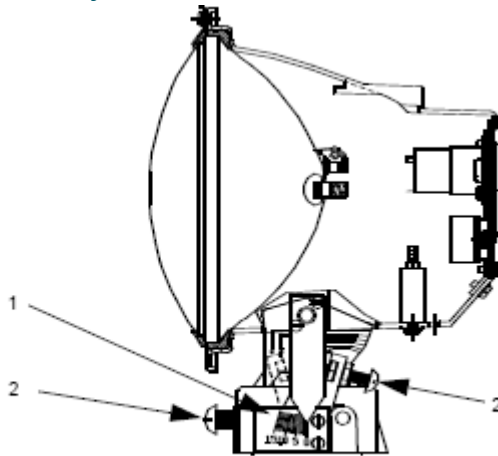
See [Figure 3](#) . Refer to *Site Specific Information* in this section for the site installation information for the flash head aiming angles.

4.5.1 Horizontal Adjustment

To adjust the horizontal, perform the following procedure:

See [Figure 10](#) . Loosen 3 round head screws (2) and using the horizontal aiming scale (1) on the head-support arm, orient the beam axis of each flash head 15 degrees outward from a line parallel to the runway centerline.

Figure 10: Head Assembly



- 1 Aiming Scale
- 2 Screws

Tighten screws (2) when adjustment is completed.

4.5.2 Vertical Adjustment

See [Figure 10](#) . The vertical axis of the light beam shall be inclined upward at an angle of 10 degrees above the horizontal.

To adjust the vertical, loosen 2 round head screws (2), and use the head angle indicator scale (1) to set the vertical axis of the light beam.

4.5.3 Installing Baffles



Warning

Remove power to L-849 before attempting to make any modifications.



Note

The baffle system meets FAA specification as described in AC 150/5340-14 but is not ETL certified.

To install baffles on the L-849A/C/E REIL, perform the following procedure:

1. Prepare special tools and equipment as listed below.

- Small standard screwdriver
- Socket for #8-32 hex head nut
- Ratchet for #8-32 hex head socket
- Electric or air drill
- 3/16 drill bit

2. Prepare Baffle Retrofit Kit 94A0198 with components listed below.

Description	Part Number	Quantity
Baffle Assembly - Left Hand	44D2408-1	1
Baffle Assembly - Right Hand	44D2408-2	1
Spacer, 0.25 OD x ½ in. long	66A0016	4
Screw, pan hd. #8-32 x 3/8	64A0191/6	8
Nut, hex #8-32	65A0043/3	2
Flatwasher, #8	66A0015/15	10
Lockwasher, split #8	66A0026/15	12
Screw, pan hd #8-32x5/8	64A0191/10	2

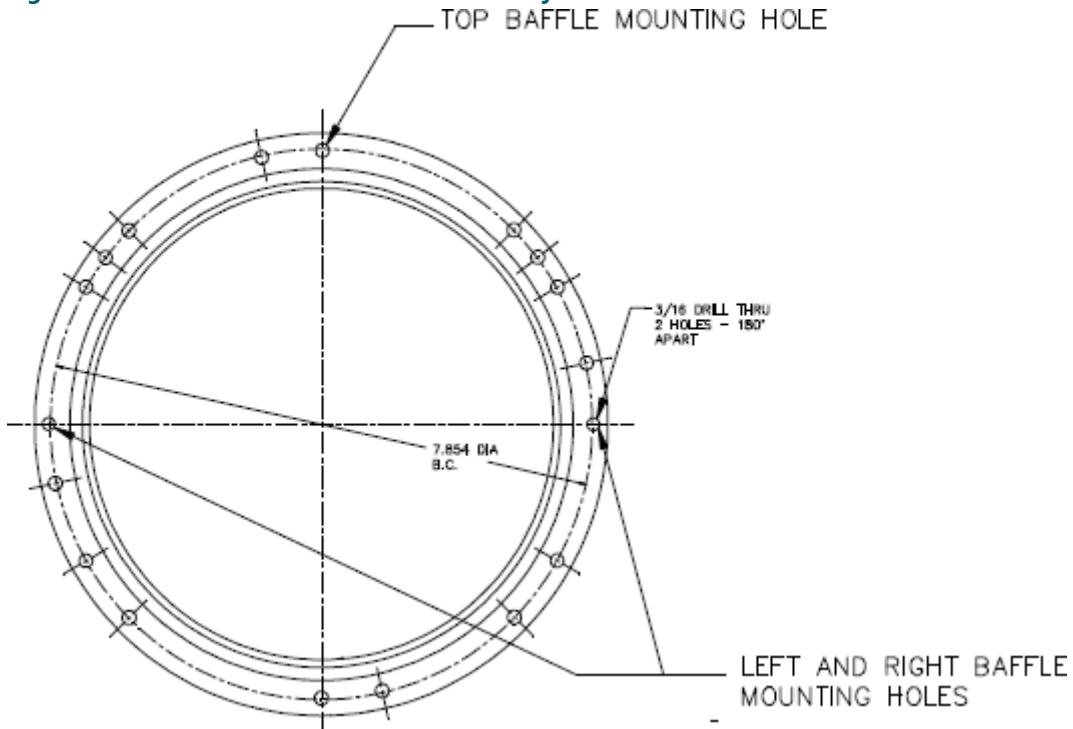
3. Drill two additional holes into the flange of the flash head. See [Figure 11](#) for location of the new holes on the left and right side of the flash head flange. The center top hole is already in the flange and is ready to use.



Warning

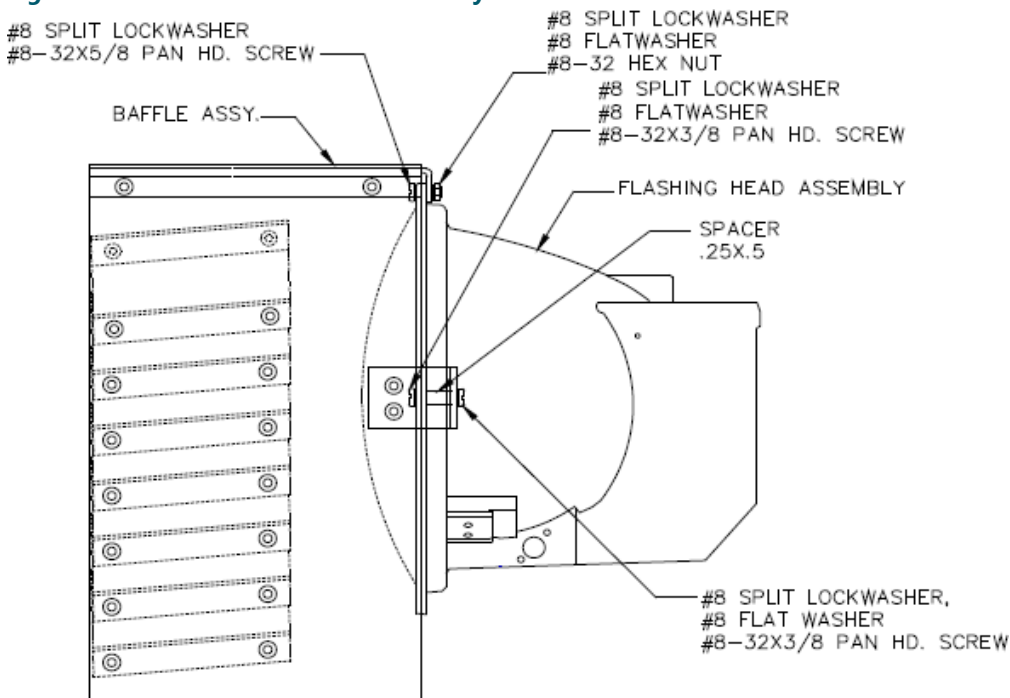
The baffle fins are slanted with the low end of the fin pointing toward the centerline of the runway. Therefore there is a LEFT- and RIGHT-HAND baffle assembly. Left and Right are as viewed by the pilot on approach.

Figure 11: Hole Location in Flash Head Assembly



4. Locate the three mounting clips on the left (44D2408-1) or the right (44D2408-2) sides of the baffle assembly.
5. Attach spacer to mounting clip using #8-32 x 3/8 long pan head screws, #8 split lockwashers, and #8 flatwashers as shown in Figure 12 .

Figure 12: Baffle and Flash Head Assembly



-
6. Insert flashing head assembly into baffle assembly as shown in [Figure 12](#) , aligning mounting holes (see [Figure 11](#) and [Figure 12](#)) in flashing head assembly with left and right spacers and top mounting clip.
 7. Secure flashing head assembly to left and right mounting clips by attaching to spacer using #8-32 x 3/8 long pan head screws and #8 flatwashers as shown in [Figure 12](#) .
 8. Secure flashing head assembly to top mounting clip using #8-32 x 5/8 long pan head screw, #8 split lockwashers, #8 flatwasher, and #8-32 hex nut as shown in [Figure 12](#) .
 9. Repeat procedure for the other baffle.

4.6 Electrical Connections

See [Wiring Schematics](#) on page 40 for external wire connections to the master and slave units.

Note

All electrical wiring shall be made in accordance with the National Electrical Code and the local regulator authority.

Wiring between the flash head and the individual control cabinet is connected and supplied with unit. Proper wire size information for the external connections is given in [Wiring Schematics](#) on page 40. It is recommended that external lightning arrestors be added to incoming power lines as local conditions require.

Warning

Disconnect power to the lighting circuit before attempting to make any electrical connections. Coordinate a power outage with air traffic personnel before turning power to the airport lighting system off.

4.6.1 Grounding Units

See [Figure 32](#) thru [Figure 35](#) in the *Parts* section. Ground the master and slave units by connecting a No. 6 bare solid copper wire at the earth ground lug provided inside the cabinets and route the wire through the conduit to the grounding rod. The ground resistance shall not exceed 25 ohms with the power feeder neutral disconnected. If necessary, additional ground rods shall be installed and interconnected to obtain the required resistance. The ground wires shall be connected to the ground rods by either an exothermic process (Erico Products Corporation, Cadweld, Burndy Corporation, Thermoweld or equivalent) or by brazing.

Warning

Pipe straps shall not be used for grounding purposes. Ground connections and lugs shall be the best commercial type.

4.6.2 Master/Slave Cabinet and Remote Control Wiring

Refer to the guidelines below when wiring the master/slave cabinet and the remote control.

- For L-849A/C REILs, install interconnecting power and control wiring (AWG 16 minimum, 600 V) between terminal blocks TB1 terminals 1 through 6 (for L-849E, terminals 1 through 8) on the master and slave cabinet as indicated in [Wiring Schematics](#) on page 40. Refer to [Table 10](#) and [Table 11](#) for L-849A/C REIL and [Table 12](#) and [Table 13](#) for the L-849E REIL.
-

Warning

It is important for proper operation that the cable for the reset wiring be shielded.

- Make remote control circuitry connections (AWG 16 minimum, 600 V) to master terminal block TB1 terminals 7 through 9 (if the current sensing option is not used) as shown in [Wiring Schematics](#) on page 40.
-

Note

When the current sensing option is used, remote control is not possible and terminals 7 through 9 are not used. Check for proper installation and firm connections.

Table 10: L-849A/C Master TB1 Terminal Functions

Terminal	Function	Note
TB1-1	120 Vac input power/120 Vac power to slave	
TB1-2	Neutral	
TB1-3	120 Vac input power/120 Vac power to slave	

Table 10: L-849A/C Master TB1 Terminal Functions (continued)

Terminal	Function	Note
TB1-4	For L-849A/C, ON command to slave	
TB1-5	Reset command to slave	A
TB1-6	Reset common	A
TB1-7	Source for 120 Vac used in remote	B
TB1-8	Remote neutral	B
TB1-9	Remote ON command	B
TB1-10	No connection	
TB1-11	6.6 A input for current sensing	
TB1-12	6.6 A input for current sensing	

NOTE A: Wires must be shielded.

NOTE B: Not used if optional current sensing is present.

Table 11: L-849A/C Slave TB1 Terminal Functions

Terminal	Function	Note
TB1-1	120 Vac input power from master TB1-1	
TB1-2	Neutral from master TB1-2	
TB1-3	120 Vac input power from master TB1-3	
TB1-4	ON command from master TB1-4	
TB1-5	Reset command from master TB1-5	A
TB1-6	Reset common from master TB1-6	A

NOTE A: Wires must be shielded.

Table 12: L-849E Master TB1 Terminal Functions

Terminal	Function	Note
TB1-1	120 Vac input power/120 Vac power to slave	
TB1-2	Neutral	
TB1-3	120 Vac input power/120 Vac power to slave	
TB1-4	On/low intensity command to slave	
TB1-5	Medium and high intensity command to slave	
TB1-6	High intensity command to slave	
TB1-7	Reset command to slave	A
TB1-8	Reset common	A
TB1-9	Source for 120 Vac used in Remote	B
TB1-10	Remote neutral	B
TB1-11	Remote on/low intensity command	B
TB1-12	Remote medium and high intensity command	B
TB1-13	Remote high intensity command	B

Table 12: L-849E Master TB1 Terminal Functions (continued)

Terminal	Function	Note
TB1-14	6.6 A input for current sensing	
TB1-15	6.6 A input for current sensing	

NOTE A: Wires must be shielded.

NOTE B: Not used if optional current sensing is present.

Table 13: L-849E Slave TB1 Terminal Functions

Terminal	Function	Note
TB1-1	120 Vac input power from master TB1-1	
TB1-2	Neutral from master TB1-2	
TB1-3	120 Vac input power from master TB1-3	
TB1-4	On/low intensity command from master TB1-4	
TB1-5	Medium and high intensity command from master TB1-5	
TB1-6	High intensity command from master TB1-6	
TB1-7	Reset command from master TB1-7	A
TB1-8	Reset command from master TB1-8	A

NOTE A: Wires must be shielded.

4.6.3 Series Circuit Powered REIL

See [Wiring Schematics](#) on page 40. If the REIL system is to be powered from a series circuit, a ADB Safegate PA-4 power adapter is required to provide the 120/240 Vac power for the REIL. The adapter can be installed on top of the ground, in a frangible enclosure, or in a 16-inch- diameter (minimum) x 24-inch high (406.4-mm diameter x 609.6 mm high) L-867 light base.

To install power and control wiring between master and slave cabinets, perform the following procedure:

1. Install interconnecting power and control wiring between master and slave cabinets as specified in *Master/Slave Cabinet and Remote Control Wiring* in this section.



Note

If the power adapter is installed near a runway circuit splice (such as an isolation transformer), the runway lighting circuit cable will not need to be cut. If no direct interconnection is possible, cut the runway lighting circuit in accordance with proper airport installation authority regulations.



Note

Use a single pole L-823 connector kit (in accordance with FAA Advisory Circular AC 150/5345-26) to terminate the cut wire ends.

2. Disconnect power to the series lighting circuit and make wire connections as shown in Figures 8-12 (L-849A/C), 8-13 (L-849E), and 8-14 (L-849A/C/E).
3. Route the 120/240 Vac secondary output power cables (AWG 12 minimum, 600 V) from the power adapter's secondary leads to an external circuit breaker, if required (not supplied) and from the circuit breaker to terminal block TB1, terminals 1, 2, and 3 in the master cabinet.
4. See Figures 8-10 and 8-12 (L-849A/C) and 8-11 and 8-13 (L-849E). Tighten all connections.



Note

If current sensing option is used, refer to *Current Sensing Connections* in this section for required connections.

4.6.4 120/240 Vac Powered REIL

Perform the procedure below if power for the REIL system is provided from a 120/240 Vac parallel power supply (other than a 6.6 A power adapter).

To install 120/240 Vac powered REIL, perform the following procedure:

1. Install interconnecting and control wiring as specified in *Master/Slave Cabinet and Remote Control Wiring* in this section.
2. Refer to [Table 3](#) for isolation transformer requirements. See Figures 8-10 (L-849A/C) and 8-11 (L-849E). Connect the 120/240 Vac power supply lines to a customer-supplied external circuit breaker, if required.
3. Disengage the circuit breaker and connect power supply lines from the circuit breaker to terminal block TB1 terminals 1, 2, and 3 in the master cabinet.
4. Tighten all connections.



Note

If the current sensing option is used, refer to *Current Sensing Connections* in this section for the required connections.

4.6.5 Current Sensing Connection

Refer to [Table 3](#) for required isolation transformers. Refer to the guidelines below when wiring the current sensing connections.

- If the PA-4 power adapter option is used, make connections as shown in [Wiring Schematics](#) on page 40.
- If a separate 120/240 Vac power supply is used, install an L-830 isolation transformer for current sensing as shown in [Wiring Schematics](#) on page 40
- (L-849A/C) and 8-13 (L-849E) in [Wiring Schematics](#) on page 40. Route the secondary output leads from the L-830 isolation transformer to terminal block TB1 terminals 11 and 12 (terminals 14 and 15 for L-849E) in the master cabinet using AWG 16 minimum, 600 V wire.

4.7 Installation Checkout

This subsection describes procedures for installation checkout. See [Wiring Schematics](#) on page 40.

4.7.1 Wiring Checkout

Refer to the guidelines below when checking out wiring.

- All grounding connections to equipment, housing, structures, and ground rods shall be thoroughly checked. The ground resistance of all ground rods shall be within the limits specified in project plans and specifications.



Warning

All power should be off while resistance checks are being made. A potential of 240 Vac may be present, which can be lethal.

-
- All power and control wiring shall be carefully and thoroughly verified. Using an ohmmeter, check all wires to make sure that proper connections are made.



Warning

If the system is turned on and wiring is connected improperly, all or part of the system can be damaged and void the warranty.

4.7.2 Connector, Plug, and Jack Checkout

Carefully check all connections, plug and jack connections, and other wiring disconnects for proper mating. Check all terminal board connections for tightness.

4.7.3 Safety Switch Checkout

Check the master and slave cabinets and flash heads for complete closure and latching, making sure that the interlock safety switches are depressed.

4.8 Initial Startup and Preliminary Test



Warning

Before applying power to any part of the system, carefully read and observe at all times the safety instructions in the Safety section in this manual.

Refer to the guidelines below upon initial startup and preliminary testing.

- Make sure the ON/OFF service switch in the master and slave cabinets is set to OFF. Turn on power to the REIL (engage external circuit breaker) and verify that the following AC voltages are present on TB1 in the master control cabinet:
 - Across terminal block TB1 terminals 1 and 2: 120 Vac 5%
 - Across terminal block TB1 terminals 3 and 2: 120 Vac 5%
 - Across terminal block TB1 terminals 1 and 3: 240 Vac 10%
 - If 0 Vac is obtained across TB1 terminals 1 and 3, the leads on the power adapter (when used) may need to be switched at the external circuit breaker.
-



Note

If a power adapter is used, use a true rms-reading voltmeter. A true rms meter will measure non-sinusoidal voltages.

- Check the REIL system in all modes of operation. Refer to REIL Startup Procedure in the peration section.
- Check the remote control operations, if used.
- If master, slave, or entire system has to be shut down, follow procedures in *Shutdown* Procedure in the Operation section.

4.9 L-849 REIL Monitor

This subsection describes the installation procedure for the L-849 REIL monitor.

4.9.1 L-849 REIL Monitor Operation

The optional ADB Safegate L-849 REIL Monitor PCB is installed in the master and slave cabinets to monitor the operation of each flasher. If the number of consecutive misfires on one flasher equals the dip switch setting on the monitor PCB (dip switch can be manually set for either 2, 4, 8 or 16 consecutive misfires), the power to both flashers is turned off.

To re-energize the flashers, switch power off using switch S1 in the master cabinet for 5 seconds and then turn S1 on. This resets the misfire counter on the monitor PCB to zero and restarts the monitoring of flasher misfires.

Note

If either master or slave continues to misfire after power is reset, both flashers will turn off again after a short time delay (approximately 30 seconds). This built-in time delay eliminates cold start-up-failure shutdowns.

4.9.2 Setting Monitor's Misfire Count

Refer to [Table 14](#) . The number of consecutive flasher misfires that can occur before the monitor turns the power off to both flashers is set manually on the Monitor PCB dip switch SW1.

Table 14: Dip Switch SW1 Setting for Monitor PCB

Number of consecutive misfires before power to both flashers is shut down	2 (Pin 1)	4 (Pin 2)	8 (Pin 3)	16 (Pin 4)
2 misfires	ON	OFF	OFF	OFF
4 misfires	OFF	ON	OFF	OFF
8 misfires	OFF	OFF	ON	OFF
16 misfires	OFF	OFF	OFF	ON

Note

The dip switch SW1 must be set to the same misfire level on both REIL monitor PCBs in the master and slave cabinet for proper operation. If, for example, dip switch SW1 in the slave cabinet is set for 8 misfires, then the monitor dip switch SW1 in the master must also be set to 8 misfires.

5.0 Operation



Warning

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

This section provides instructions for operating the L-849A/C/E Runway End Identifier Lights (REIL).

The L-849 REIL system may be operated by local or remote control. Remote control is by switch or radio receiver/decoder unit. For maintenance purposes, a rotary selector switch is provided inside the master individual control cabinet for local control.

5.1 Operational Modes

Refer to [Table 15](#) and [Table 16](#). A rotary selector switch, found in the master individual control cabinet, has three settings: REMOTE, OFF and ON. These settings can control the flashing lights locally or turn control of the lights over to a remote location. The REMOTE setting on the rotary selector switch turns control of the system over to a remote control system that can turn the flashing lights on or off.

Table 15: L-849A/C REIL Modes of Operation

Master Oscillator PCB Rotary Switch S1 Position (Master Cabinet)	Remote Control Panel Setting	Operational Results	Note
ON (L-849A)	All settings	Flashers operate at high intensity	
ON (L-849C)	All settings	Flashers operate at low intensity	
OFF	All settings	System off—no flashing	
REMOTE	OFF	System off—no flashing (except when current sensing is present)	A
REMOTE	ON (L-849A)	Flashers operate at high intensity	
REMOTE	ON (L-849C)	Flashers operate at low intensity	

NOTE A: When current sensing option is present, turning S2 to OFF does not remove power to flashers unless switch S1 is turned to OFF. Turn S1 to OFF to service cabinet.

Table 16: L-849E REIL Modes of Operation

Rotary Switch S2 Position (Master Cabinet)	Remote Control Panel Setting	Operational Results	Note
OFF	All settings	System off—no flashing	
HIGH	Any	Flashers operate at high intensity	
MEDIUM	Any	Flashers operate at medium intensity	
LOW	ANY	Flashers operate at low intensity	
REMOTE	OFF	System off—no flashing (except when current sensing is present)	A
REMOTE	LOW	Flashers operate at low intensity	
REMOTE	MEDIUM	Flashers operate at medium intensity	
REMOTE	HIGH	Flashers operate at high intensity	

NOTE A: When current sensing option is present, turning S2 to OFF does not remove power to flashers unless switch S1 is turned to OFF. Turn S1 to OFF to service cabinet.

5.2 Operating Procedures

This subsection provides information on the REIL and power adapter startup procedures.

5.2.1 REIL Startup Procedure

No actual startup procedure exists for the REIL except for the guidelines below. Follow these guidelines before operating the REIL.

- Make sure that the ON/OFF service switch S1 on the input module in the master and slave cabinets is set to the ON position.
- Make sure that the rotary control switch on master oscillator PCB in master cabinet is set to:
 - REMOTE position for remote or current sensing operation. -OR-
 - ON position for local operation for L-849A (high intensity) or for L-849C (low intensity).
-OR-
 - LOW, MEDIUM, or HIGH position for local operation.
- Make sure that the master and slave cabinet doors are properly closed to activate interlock switch S2 on door.
- In case of remote operation, make sure that the remote control switch is set to the ON position for the L-849A/C REILs and LOW, MEDIUM, or HIGH position for the L-849E REIL.

The REIL system should start flashing when the external circuit breaker is engaged (power is supplied to the input power terminals of the master and slave).

5.2.2 Power Adapter Startup Procedure

No actual startup procedure for the power adapter is needed, and no on/off switching devices in the power adapter exist. The power adapter is considered to be a part of the runway lighting circuit.

5.3 Shutdown Procedure

When it is necessary to shut down an individual control cabinet (master or slave), open the cabinet door and place the ON/OFF switch in the OFF position. When the entire system is to be shut down, disengage the external circuit breaker or place the ON/OFF switch in both control cabinets in the OFF position.

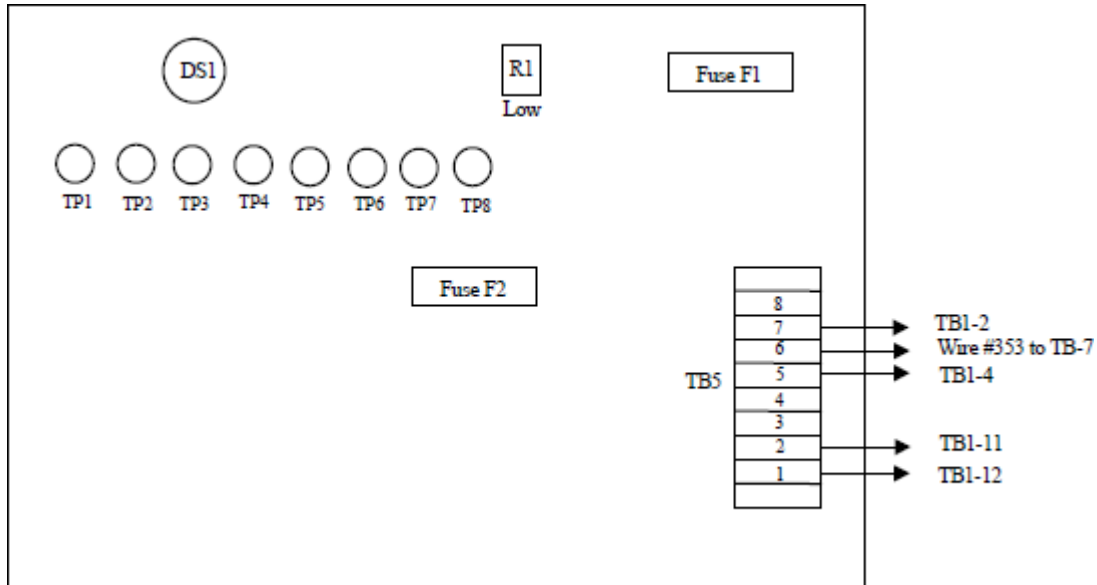
5.3.1 Current Sensing Adjustment

This subsection provides information for adjusting current sensing for the L-849A/C and L-849E current sensing PCB and setting turn-on points for one-step and three-step current sensing.

5.3.2 Adjusting L-849A/C Current Sensing PCB

See Figure 13 for the L-849A/C current sensing PCB. To adjust current sensing, turn R1 (LOW) clockwise to increase the current sensitivity on LOW.

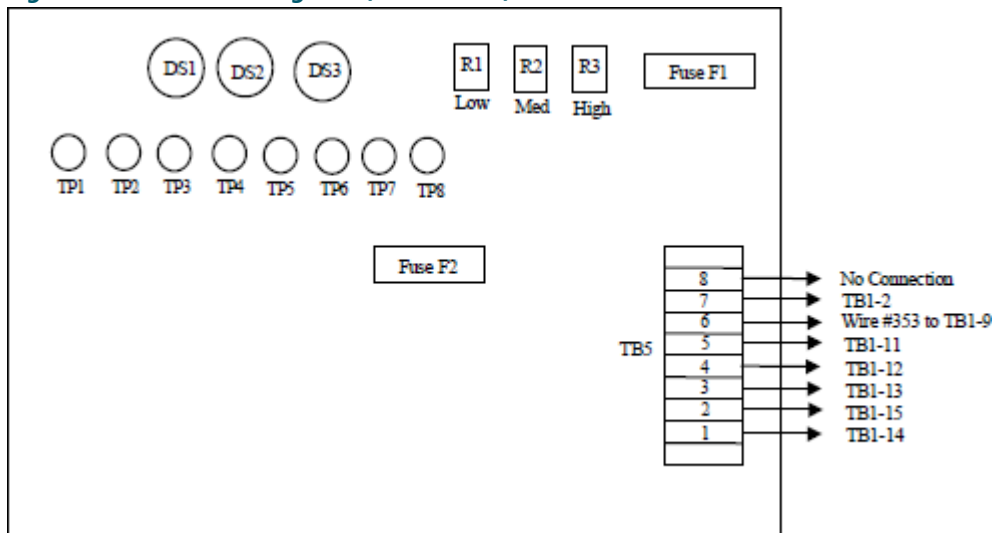
Figure 13: Current Sensing PCB (L-849A/C REIL)



5.3.3 Adjusting L-849E Current Sensing PCB

See Figure 14 for the L-849E current sensing PCB. To adjust current sensing, turn R1 (LOW), R2 (MEDIUM), and R3 (HIGH) clockwise to increase the current sensitivity on LOW, MEDIUM, and HIGH respectively.

Figure 14: Current Sensing PCB (L-849E REIL)



5.3.4 Setting Turn-On Points for One-Step Current Sensing (L-849A/C/E)

The current sensing board is preset (at the factory) to allow the REIL system to operate only when the current level in the runway lighting loop is at 6.6 A.

To change the set point for the current level for one-step current sensing, perform the following procedure:

1. Energize the runway lighting circuit at the intensity level at which the REIL system should start operating.
2. Turn potentiometer R1 (on current sensing PCB) all the way counterclockwise and then clockwise until the REIL system begins to operate. Turn R1 clockwise one additional turn.
3. After potentiometer R1 has been set, verify proper operation by taking the CCR sequentially up in current level and then back down again.

5.3.5 Setting Turn-On Points for Three-Step Current Sensing (L-849E Only)

To change the set point for the current level for three-step current sensing, perform the following procedure:

1. Turn on the runway lighting circuit to the desired low intensity level.
2. Turn on the potentiometer R1 on the current sensing PCB all the way counterclockwise and then clockwise until the REIL system begins to operate.
3. Turn the potentiometer R1 clockwise one additional turn.
4. Repeat steps 2 and 3 above with the runway lighting circuit at the desired medium intensity level (adjusting potentiometer R2) and at the high intensity level (adjusting potentiometer R3).
5. After all potentiometers have been set, verify proper operation by taking the CCR sequentially up in current level and then back down again.

5.4 Optional Impulse Relay (L-849A/C Only)

This option allows the tower to turn off the REIL system but leave the runway lights on when both the REIL and runway lights are supplied by the same constant current regulator. An impulse relay in the master cabinet turns the REIL system on or off in an ordered sequence that depends on the switching of the CCR powering the REIL on or off.

- If the CCR is switched on and the REIL system is energized along with the runway lights, the REIL system can be de-energized by switching the CCR off (1 second, minimum) then on again. This will cause the runway lights to energize but the REIL system will be de-energized.

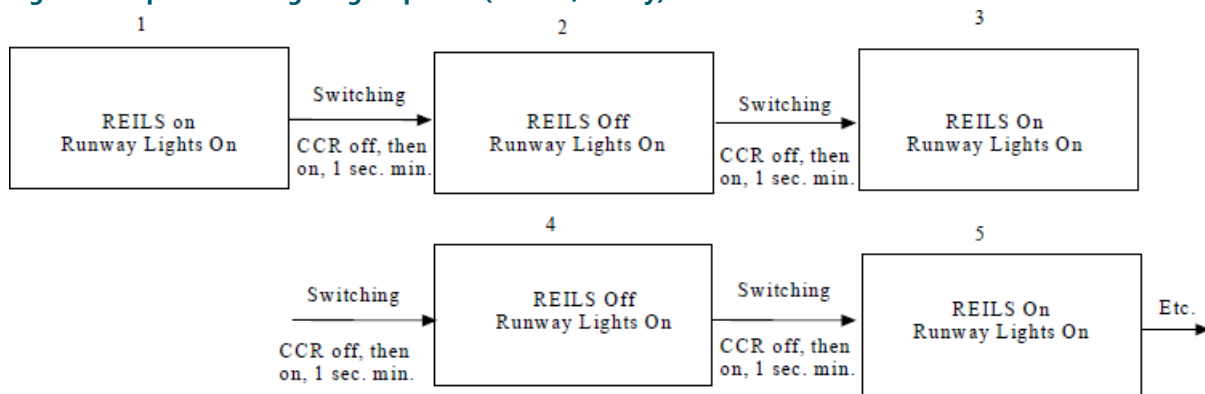


Note

The REIL system will flash for about 3 seconds after the CCR is switched back on, until the intensity discharge capacitors in the master and slave cabinets have discharged.

- See [Figure 15](#). If the CCR is switched on and the REIL system is de-energized but the runway lights are energized, the REIL system can be energized along with the runway lights by switching the CCR off (1 second, minimum) and then on again.

Figure 15: Operational Lighting Sequence (L-849A/C Only)



Note

When the CCR is initially turned on, the REILs may light or not light depending on whether the REIL system was energized or de-energized when the CCR was last turned off.

The techniques used to determine whether the REIL is on or off include the following:

- Direct tower observation
- Pilot reports using RL-854 the radio controller when lights are remotely controlled
- L-810 obstruction light connected to terminal block TB1-10 and TB1-2 (common)

6.0 Maintenance

This section provides preventive maintenance for L-849A/C/E Runway End Identifier Lights (REIL) system.

6.1 Maintenance Schedule

To keep the L-849 REIL system operating efficiently, follow a preventive maintenance schedule. Refer to [Table 17](#) .

Table 17: L-849 REIL Maintenance

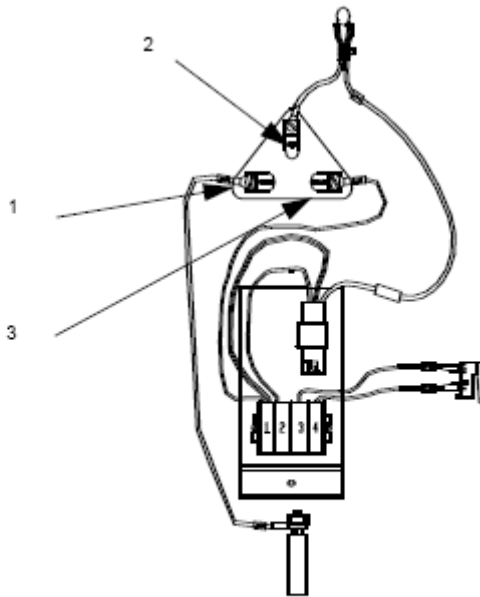
Interval	Maintenance Task	Action
Daily	Check lamp operation and flashing sequence.	Keep a log of the time lamps have operated at the high intensity level. Change lamp after 900 hours. An elapsed time meter installed as an option may be used to indicate the number of hours of operation. This meter can be manually reset after a lamp is changed.
	Check operation of controls.	If controls malfunction, replace controls.
Bimonthly	Check cleanliness of lamps.	If lamps are unclean, clean or replace lamps as required.
	Check lamps for fractures or cracks.	If lamps are cracked/fractured, replace lamps.
	Check lamp alignment.	If lamp is misaligned, realign lamp.
	Check operation of interlocks.	If interlocks malfunction, replace interlocks.
	Check for vegetation or other obstruction near lamps.	Use herbicide to remove vegetation.
Semi-Annually	Check cabinets for cleanliness and moisture.	If cabinets are moist, wipe dry.
	Check seals on enclosures.	Replace worn or deteriorated seals.
	Check electrical connections and contacts for tightness.	If contacts are loose, replace contacts.
	Check alignment and leveling of lamps.	If lamps are misaligned or not level, realign and level lamp head.
	Check wires for cracks and deterioration.	If wires are cracked/deteriorated, replace wires.
Annually	Check for rigidity of support structures.	Tighten all mounting hardware.
	Check power distribution equipment.	If power distribution equipment is faulty, replace equipment.
	Check insulation resistance of cable.	If reading is less than 500 V on meter or leaking to ground, replace cable.
	Check resistance of grounding system.	If resistance is high, repair by doing such things as replacing rods and cables.
	Check need for painting.	Touch up all chips or repaint entire enclosure.

6.2 Replacing Flash Lamp

To replace a flash lamp, perform the following procedure:

1. Turn the power off in the control cabinet by placing the On/Off service switch in the OFF position or by disengaging the external circuit breaker.
2. To remove the lamp from the housing, loosen the three pan head screws so that the lamp clips can be turned to the side of the lamp. Pull the lamp from the housing.
3. Unscrew the three wire leads at the lamp base.
4. Remove the lamp gasket and check for any signs of deterioration such as cracks or tears. If the gasket is damaged, replace with a new gasket. Install gasket on the new lamp.
5. See Figure 5-1 . Attach the three wires removed in Step 3 to the base of new lamp [wire #190 to the white terminal (1), wire #191 to the black terminal (3), and the remaining wire to the red terminal (2) on the base of the lamp].

Figure 16: L-849 Wiring



- 1 White Terminal
- 2 Red Terminal
- 3 Black Terminal

6. Carefully insert the lamp into the housing, making sure that the arrow on the lamp is vertical and pointing up.
7. Slide the 3 lamp clips over the lamp and secure by tightening the 3 pan head screws.
8. Energize the system and verify that the lamp is operating properly.

6.3 Power Adapter Maintenance

The ADB Safegate power adapter requires no maintenance. If it fails to function properly, contact the ADB Airfield Safegate Sales Department. Consult the power adapter manual for details on servicing the power adapter.

7.0 Troubleshooting

This section provides troubleshooting information for L-849A/C/E Runway End Identifier Lights (REIL) system. This information covers only the most common problems that may be encountered. If the problem cannot be solved with the information given here, contact your local ADB Safegate representative for help.



Warning

There is a lethal potential of 2000 Vdc present in this unit. Ground capacitors with a grounding rod and wait a minimum of one minute prior to touching any part in the low voltage compartment, and a minimum of five minutes prior to touching any part in the high voltage compartment. Only personnel authorized to troubleshoot on high voltage

When it is absolutely mandatory that an interlock be bypassed to trace a fault or correct a malfunction, authorized maintenance personnel may perform the bypass by pressing in the activator and turning it clockwise for the specific test to be made. Immediately after completing the test, the interlock shall be restored to working condition.

When the current sensing option is present, turning the rotary switch S2 to OFF does not remove power to the flashers unless the ON/OFF switch S1 is turned to OFF. Therefore always turn ON/OFF switch S1 to the OFF position before attempting to service the control cabinet.

7.1 Troubleshooting Procedures

Refer to [Table 18](#) for troubleshooting procedures.

Table 18: REIL Troubleshooting Procedures

Problem	Possible Cause	Solution
1. No flashing in either individual control cabinet	No input power	Check voltage at terminal block TB1 terminals 1, 2, and 3.
	Blown fuse F1 or F2 in master	Replace fuse. Determine why fuse blew.
	External circuit breaker trips each time it is turned on	Lightning arrester LA1 is shorted. Replace lightning arrester.
	If neon light DS1 for L-849A/C or DS3 for L-849E is off, 120 Vac not present across the coil of relay K1 on the panel (either in remote or local)	With a voltmeter, trace the 120 Vac voltage through the circuitry. Information on where the 120 Vac is present is given in <i>Theory of Operation</i> in Section 2 , <i>Description</i> .
	In remote, fuse F2 for L-849A/C or fuse F1 for L-849E blown on master oscillator PCB.	Replace fuse. Determine reason for short in external remote control circuitry.
	Master oscillator PCB not generating reset pulses	Look at red LED DS1 in master oscillator. It must be glowing red continuously. Green LED DS2 must be turning on and off at a rate of twice per second. If either of these conditions is not true, replace master oscillator PCB. If the master oscillator PCB is replaced and it still does not function, check 120 Vac coming into the master oscillator at TB4-4 to TB4-5.

Table 18: REIL Troubleshooting Procedures (continued)

Problem	Possible Cause	Solution
2. One individual control cabinet flashes, but the other one does not	If neon light DS1 for L-849A/C or DS3 for L-849E is off, 120 Vac not present across the coil of relay K1 on the panel (either in remote or local)	With a voltmeter, trace the 120 Vac voltage through the circuitry. Refer to <i>Theory of Operation</i> in the <i>Description</i> section.
	Flash lamp defective	Replace lamp.
	Trigger Interface PCB bad	Replace trigger interface PCB.
	DC voltage not present or out of tolerance	Measure value of DC voltage coming into Trigger Logic PCB at P1 to P3. Voltage must be approximately +300 Vdc 10%. If DC voltage is not present or out of tolerance, measure 2000 Vdc across capacitor C2. If 240 Vac is not present, determine if 240 Vac is present at T1-2 to T1-1 on HV transformer. If 240 Vac is present, determine which component in HV power supply is bad.
	Defective trigger transformer	Replace trigger transformer. Refer to <i>Trigger Transformer Replacement</i> in this section.
	Loose wire connection	With the power off and using an ohmmeter, check continuity of each wire.
2. (cont) 2. One individual control cabinet flashes, but the other one does not	Master oscillator PCB failing	Determine if green LED DS2 is flashing twice per second without interruption. If it is not, replace master oscillator PCB
	Flash lamp failing	Replace lamp.
	Trigger interface PCB failing	Replace trigger interface PCB.
	Trigger transformer failing	Replace trigger transformer. Refer to <i>Trigger Transformer Replacement</i> in this section.
3. Light flashes intermittently	Master oscillator PCB failing	Determine if green LED DS2 is flashing twice per second without interruption. If it is not, replace master oscillator PCB.
	Flash lamp failing	Replace lamp. Refer to <i>Replacing Flash Lamp</i> in the <i>Maintenance</i> section.
	Trigger interface PCB failing	Replace trigger interface PCB.
	Trigger transformer failing	Replace trigger transformer. Refer to <i>Trigger Transformer Replacement</i> in this section.
4. Incorrect flash intensity (L-849E only)	Neon lights DS1 and DS2 not illuminated properly (relays K1 or K2 in HV power supply not properly organized)	Refer to Table 2 to check neon light illumination standards. Correct the problem when it is discovered. Refer to Section 2 , <i>Description</i> , under <i>Theory of Operation</i> for information on 120 Vac. If the 120 Vac across relays K1 and K2 is correct, replace relay.
	Incorrect remote intensity command	Correct external remote control circuitry.

7.2 Wiring Schematics

Figure 17: 43A3111 L-849A/C Master Control Cabinet without Power Adapter Option

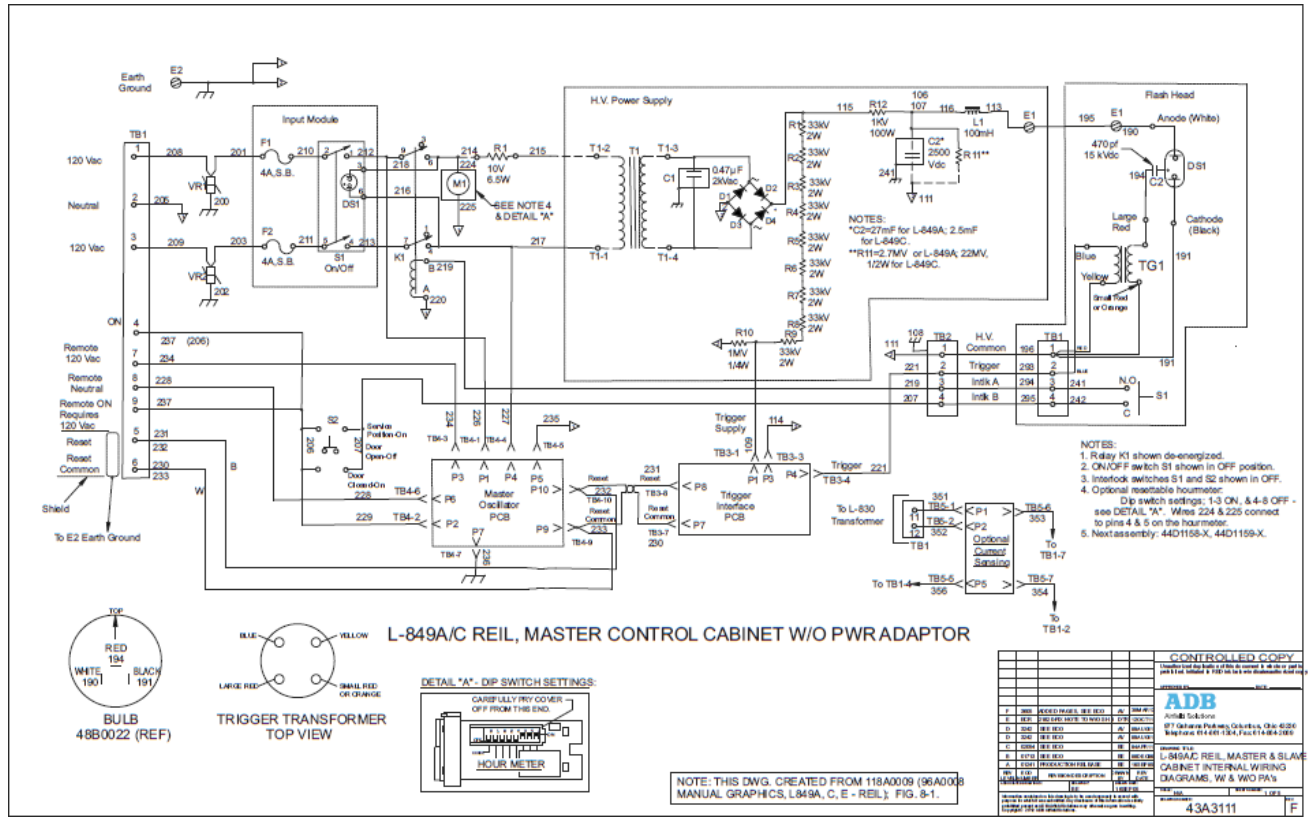


Figure 18: L-849A/C REIL, Master Control Cabinet W/ PWR Adaptor

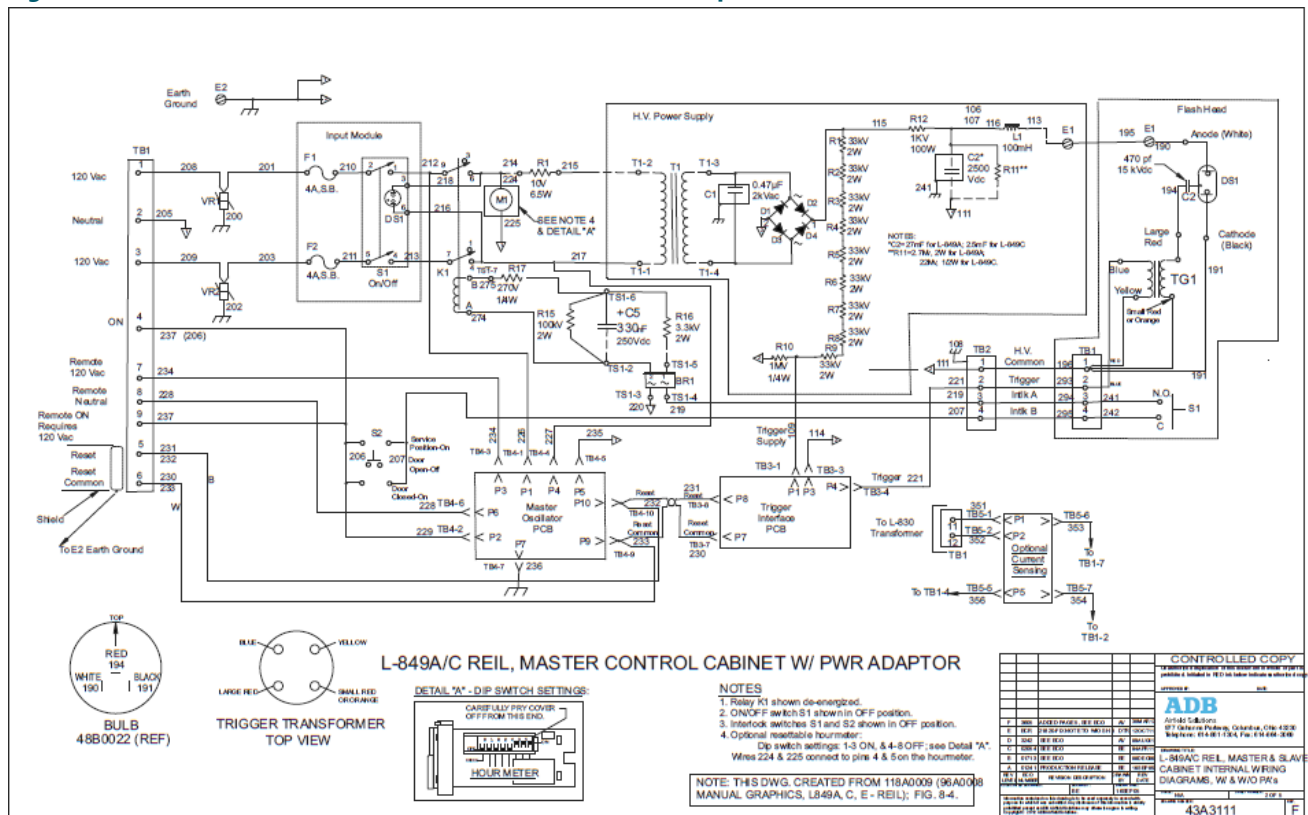


Figure 19: 20: L-849A/C REIL, Slave Cabinet W/O PWR Adaptor

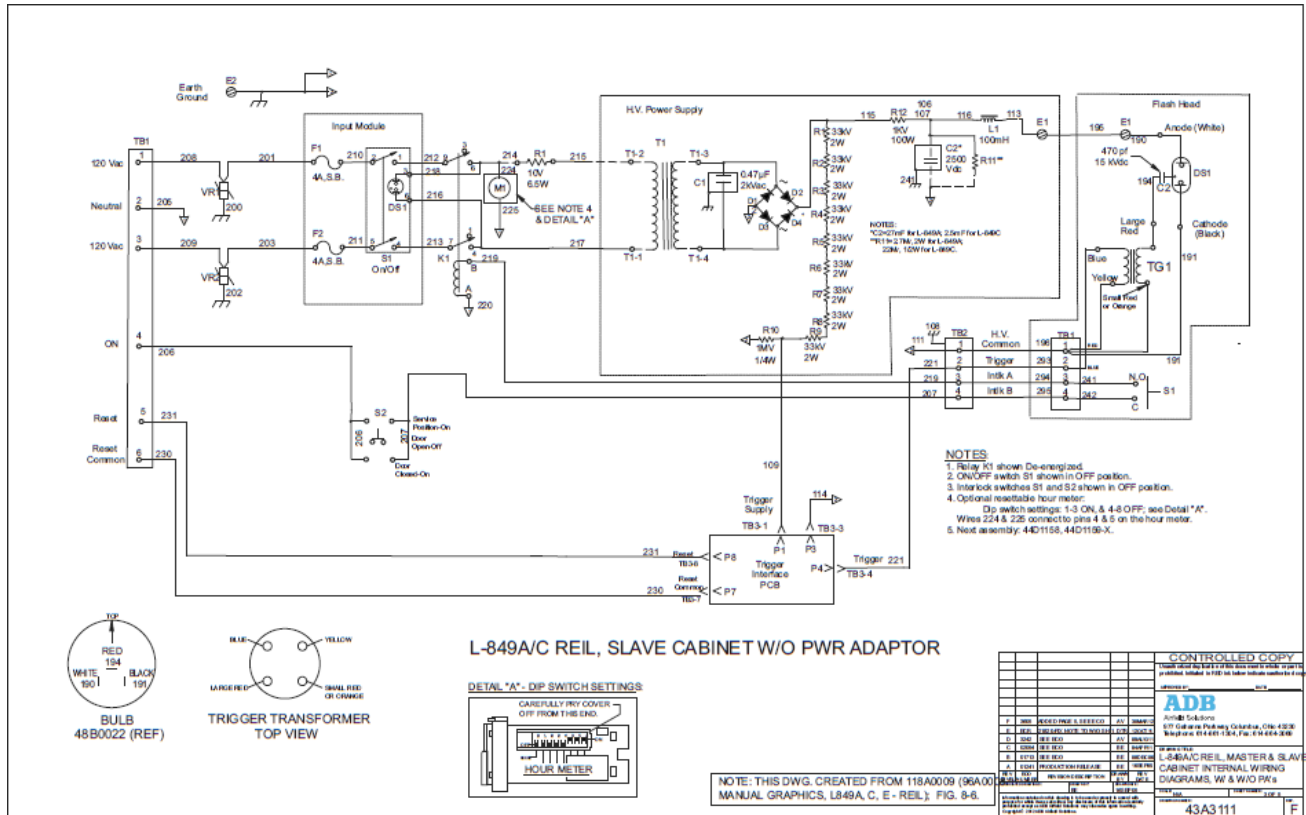


Figure 20: L-849A/C REIL, Slave Cabinet W/ PWR Adaptor

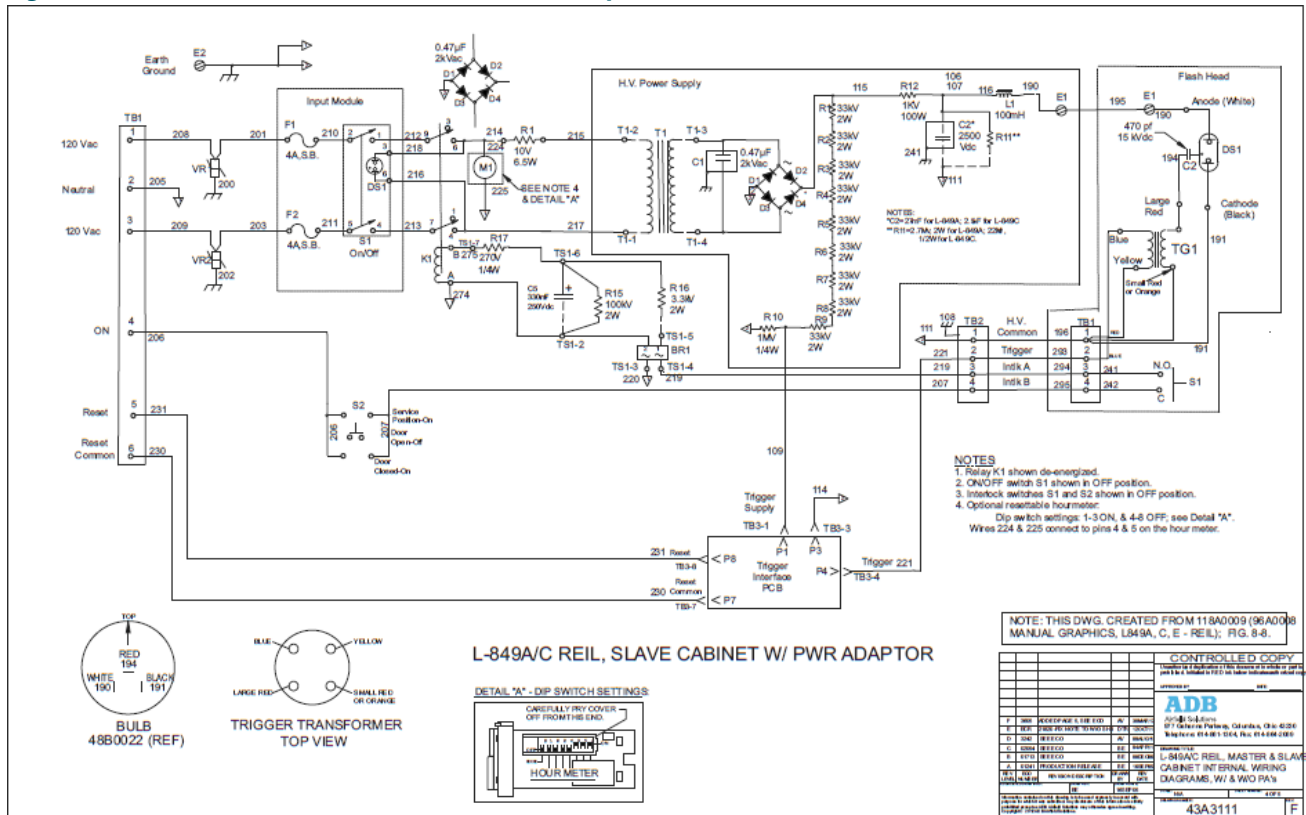


Figure 21: L-849E REIL, Master Control Cabinet W/O PWR Adaptor

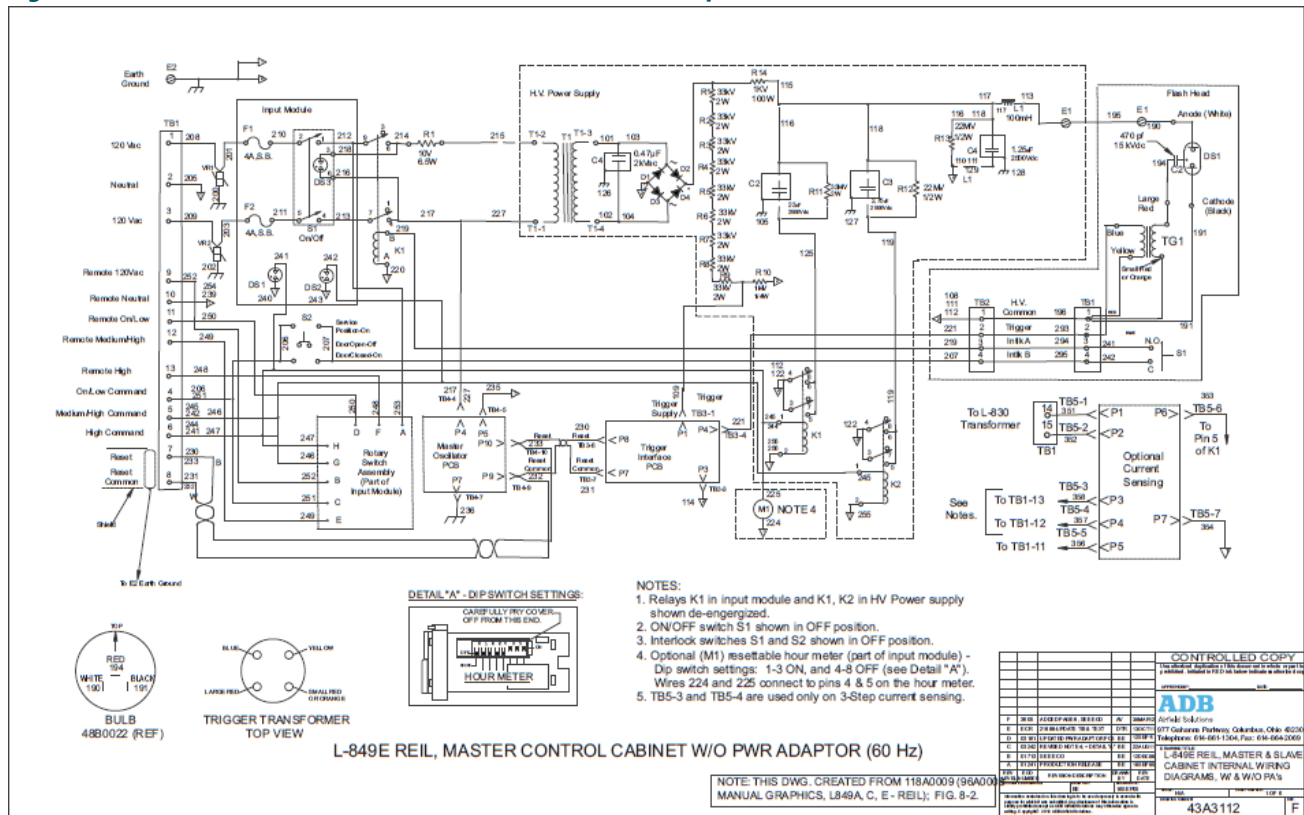


Figure 22: L-849E REIL, Master Control Cabinet W/ PWR Adaptor

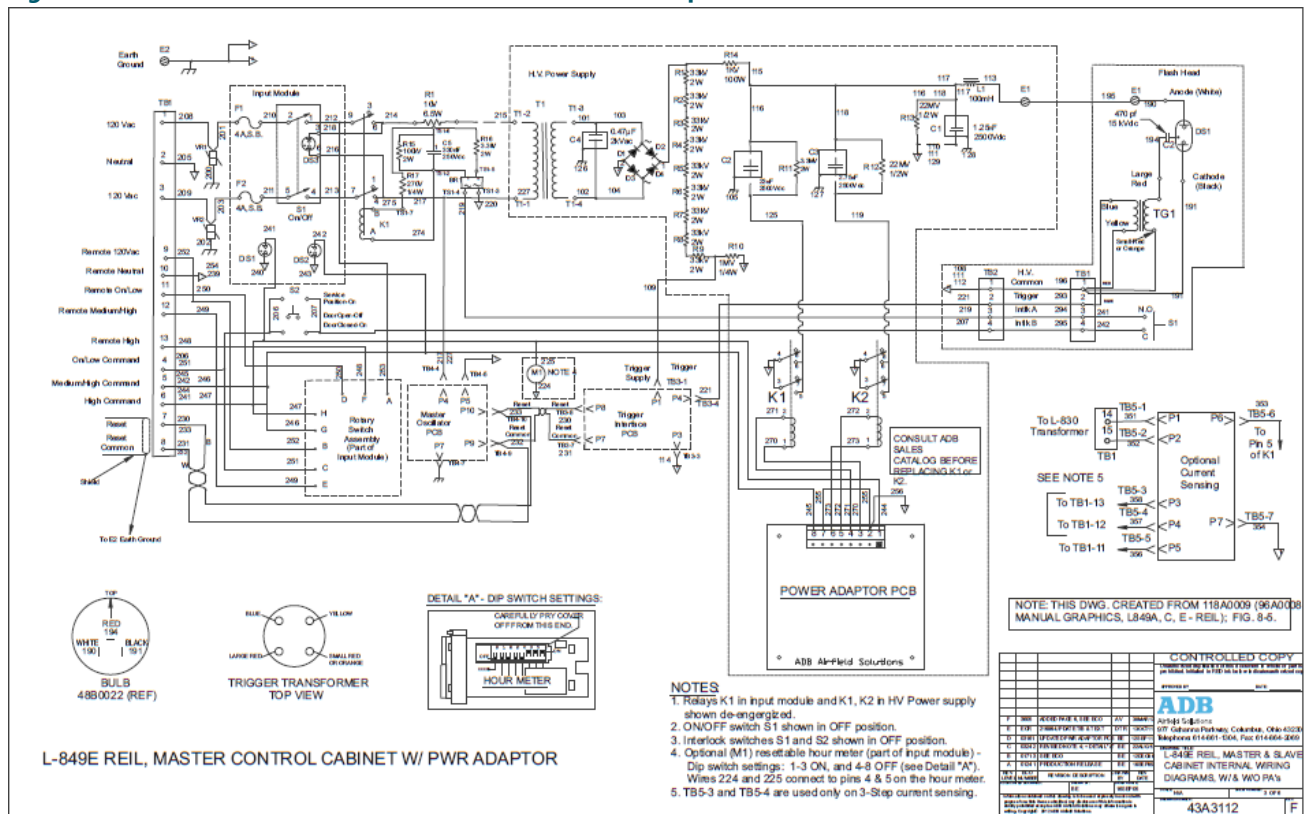


Figure 23: L-849E REIL, Slave Cabinet W/O PWR Adaptor

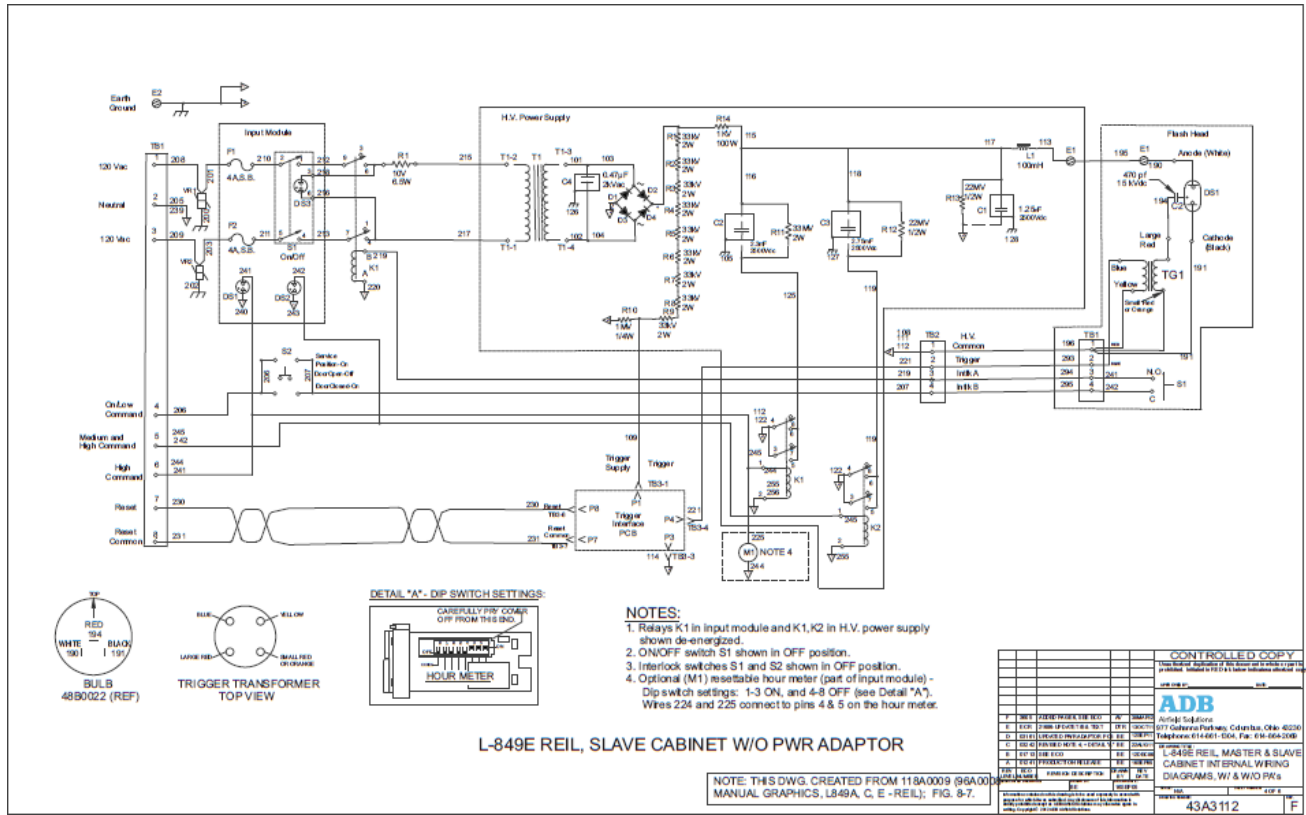


Figure 24: L-849E REIL, Slave Cabinet W/ PWR Adaptor

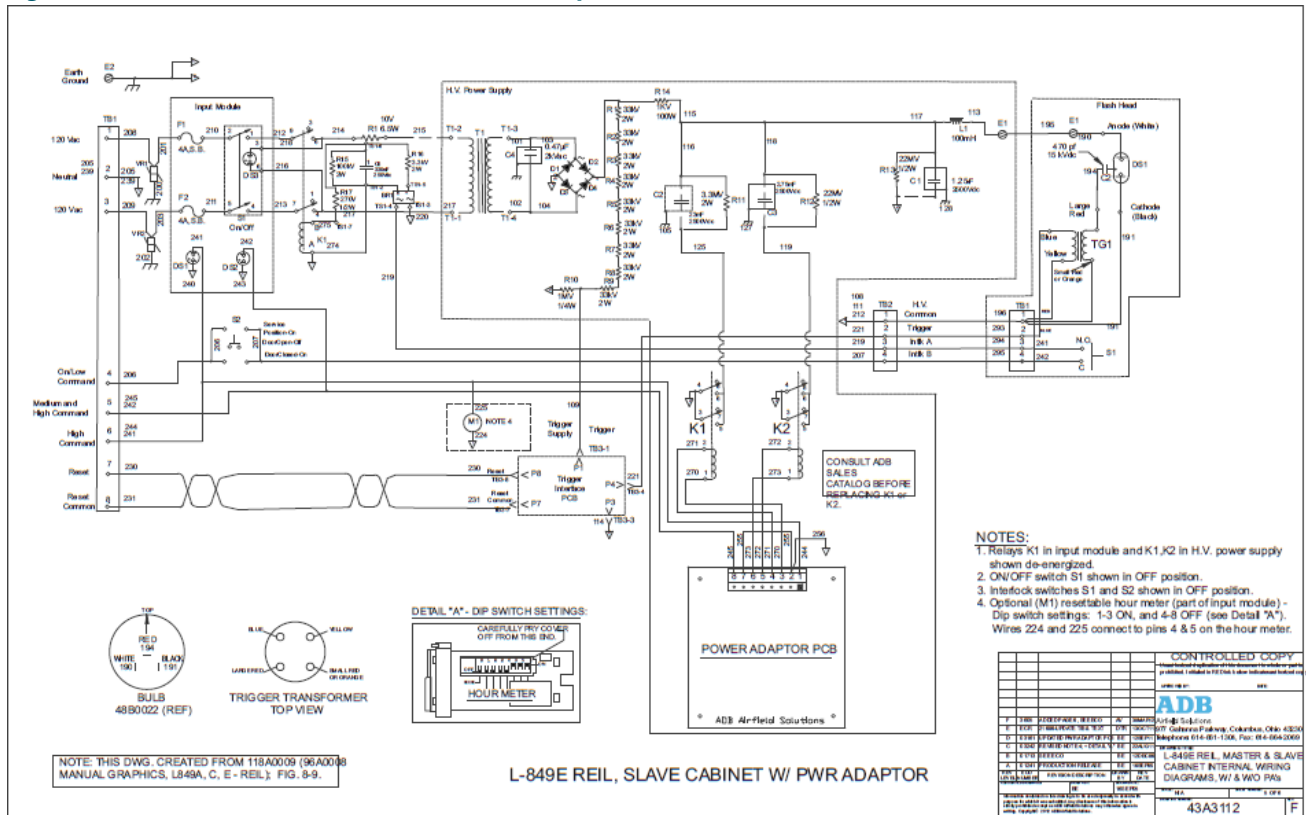


Figure 25: L-849A/C External Wiring Diagram

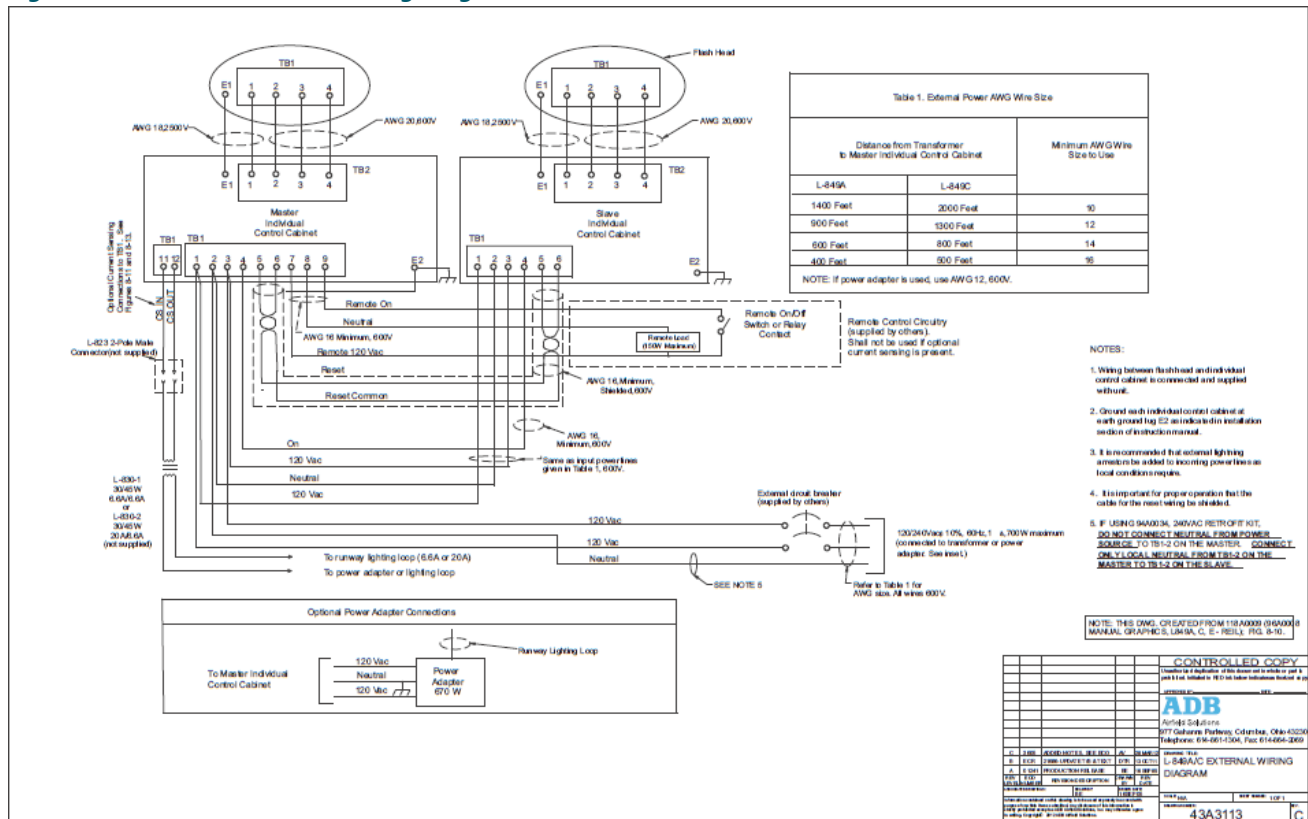


Figure 26: L-849E External Wiring Diagram

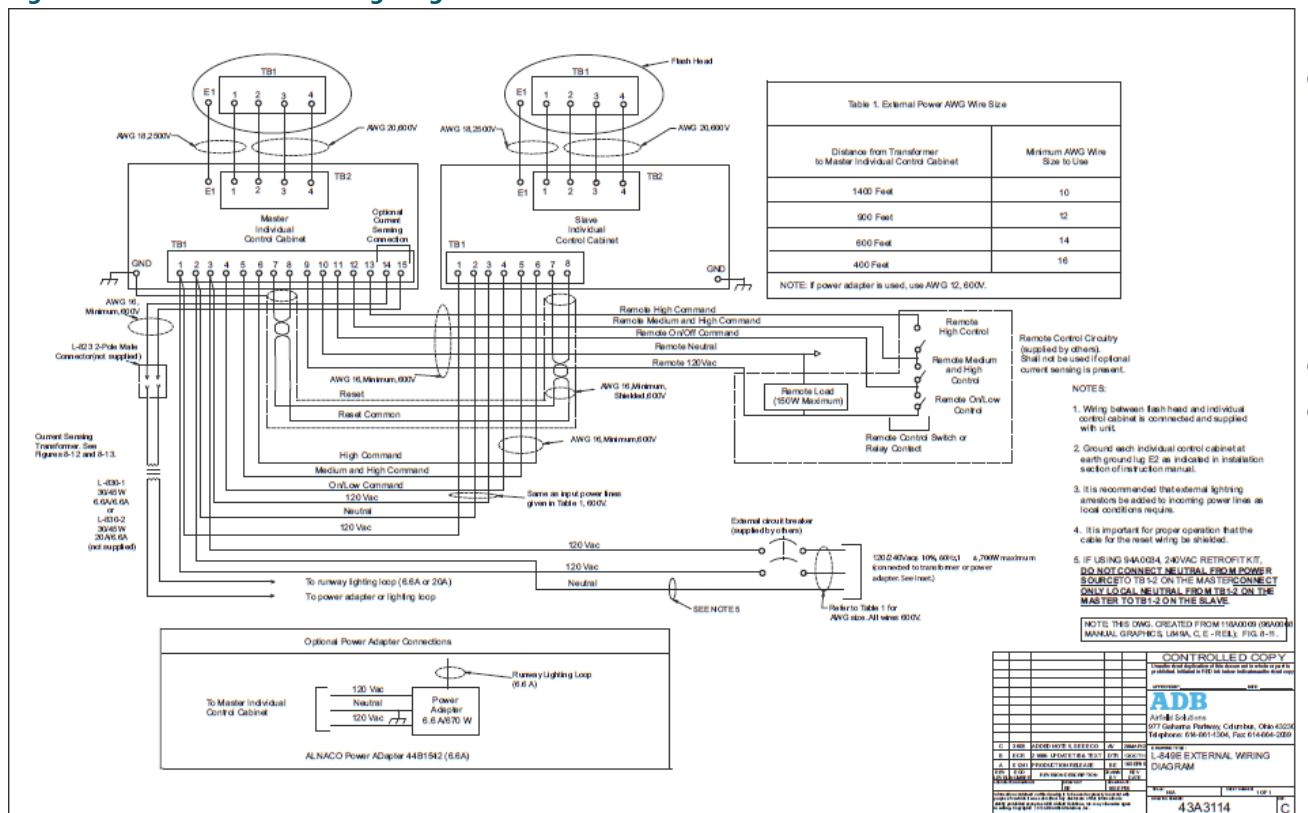


Figure 28: PA4 / REIL Wiring Diagrams

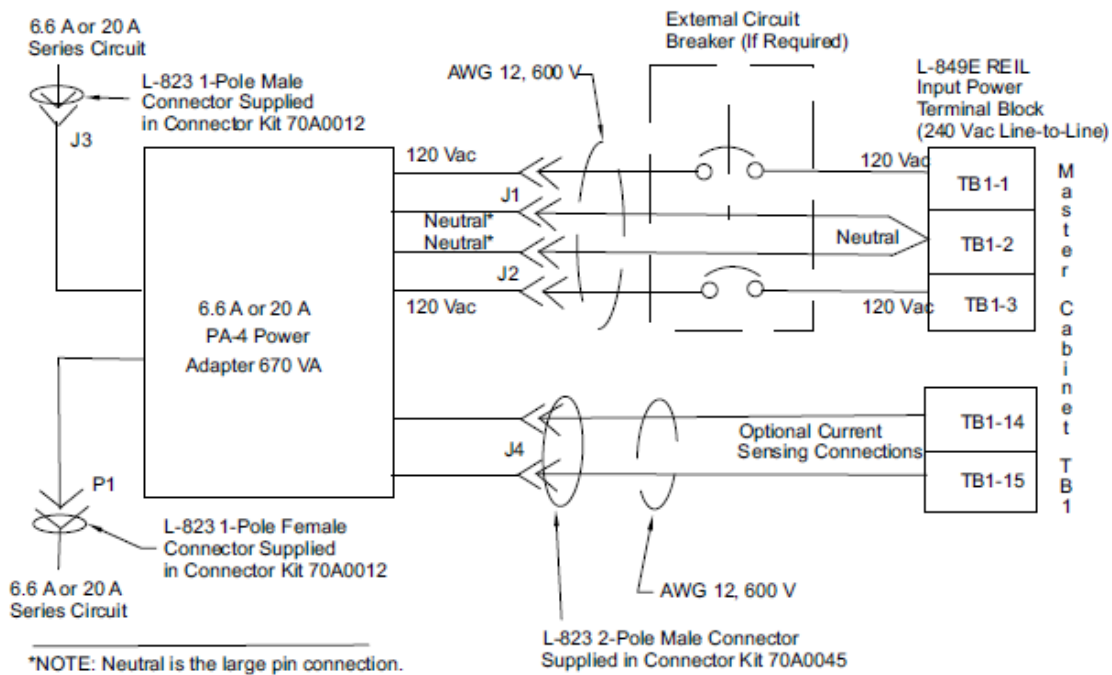
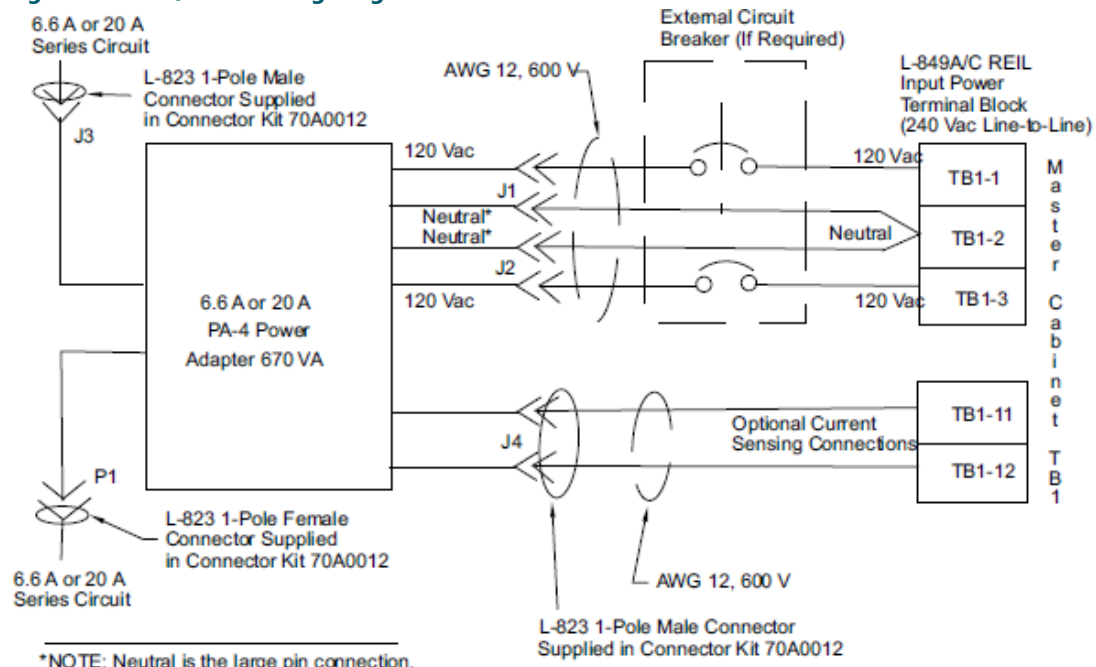
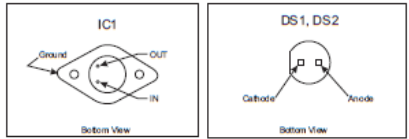
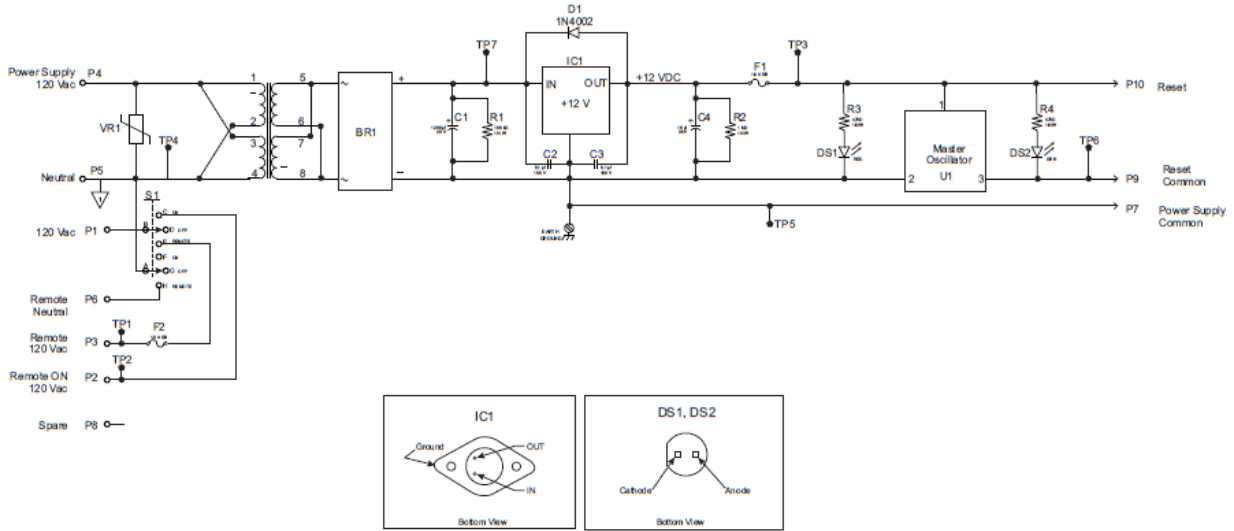


Figure 29: 43B0637 Master Oscillator Schematic



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ADB			
Aerial Solutions			
677, Calhoun Parkway, Columbus, Ohio 43230			
Telephone: 614-881-1104, Fax: 614-884-2069			
Title			
Master Oscillator			
L-849AC REIL			
Rev. A		1 of 1	
43B0637		D	

8.0 Parts

To order parts, call ADB Safegate Customer Service or your local representative.

Use this five-column parts list, and the accompanying illustration, to describe and locate parts correctly.

8.1 Master and Slave Panel Assembly Part Numbers

Refer to Table 7-1 for the master and slave panel assembly part numbers for the L-849A Runway End Identifier Light (REIL). Refer to Table 7-2 for the master and slave panel assembly part numbers for the L-849C REIL. Refer to Table 7-3 for the master and slave panel assembly part numbers for the L-849E REIL.

Table 19: L-849A Master and Slave Panel Assembly Part Numbers

Final Assembly	Master Panel Assembly	Slave Panel Assembly
44A1161-11	44D1117-01	44D1117-2
44A1161-12	44D1117-03	44D1117-4
44A1161-41	44D1117-13	44D1117-2
44A1161-42	44D1117-14	44D1117-4
44A1161-13	44D1117-21	44D1117-22
44A1161-14	44D1117-23	44D1117-24
44A1161-43	44D1117-33	44D1117-22
44A1161-44	44D1117-34	44D1117-24

Table 20: L-849C Master and Slave Panel Assembly Part Numbers

Final Assembly	Master Panel Assembly	Slave Panel Assembly
44A1161-21	44D1117-05	44D1117-6
44A1161-22	44D1117-07	44D1117-8
44A1161-51	44D1117-15	44D1117-6
44A1161-52	44D1117-16	44D1117-8
44A1161-23	44D1117-25	44D1117-26
44A1161-24	44D1117-27	44D1117-28
44A1161-53	44D1117-35	44D1117-26
44A1161-54	44D1117-36	44D1117-28

Table 21: L-849E Master and Slave Panel Assembly Part Numbers

Final Assembly	Master Panel Assembly	Slave Panel Assembly
44A1161-31	44D1117-09	44D1117-10
44A1161-32	44D1117-11	44D1117-12
44A1161-61	44D1117-17	44D1117-10
44A1161-62	44D1117-18	44D1117-12
44A1161-71	44D1117-19	44D1117-10
44A1161-72	44D1117-20	44D1117-12
44A1161-35	44D1117-29	44D1117-30
44A1161-36	44D1117-31	44D1117-32
44A1161-65	44D1117-37	44D1117-30

Table 21: L-849E Master and Slave Panel Assembly Part Numbers Figure (continued)

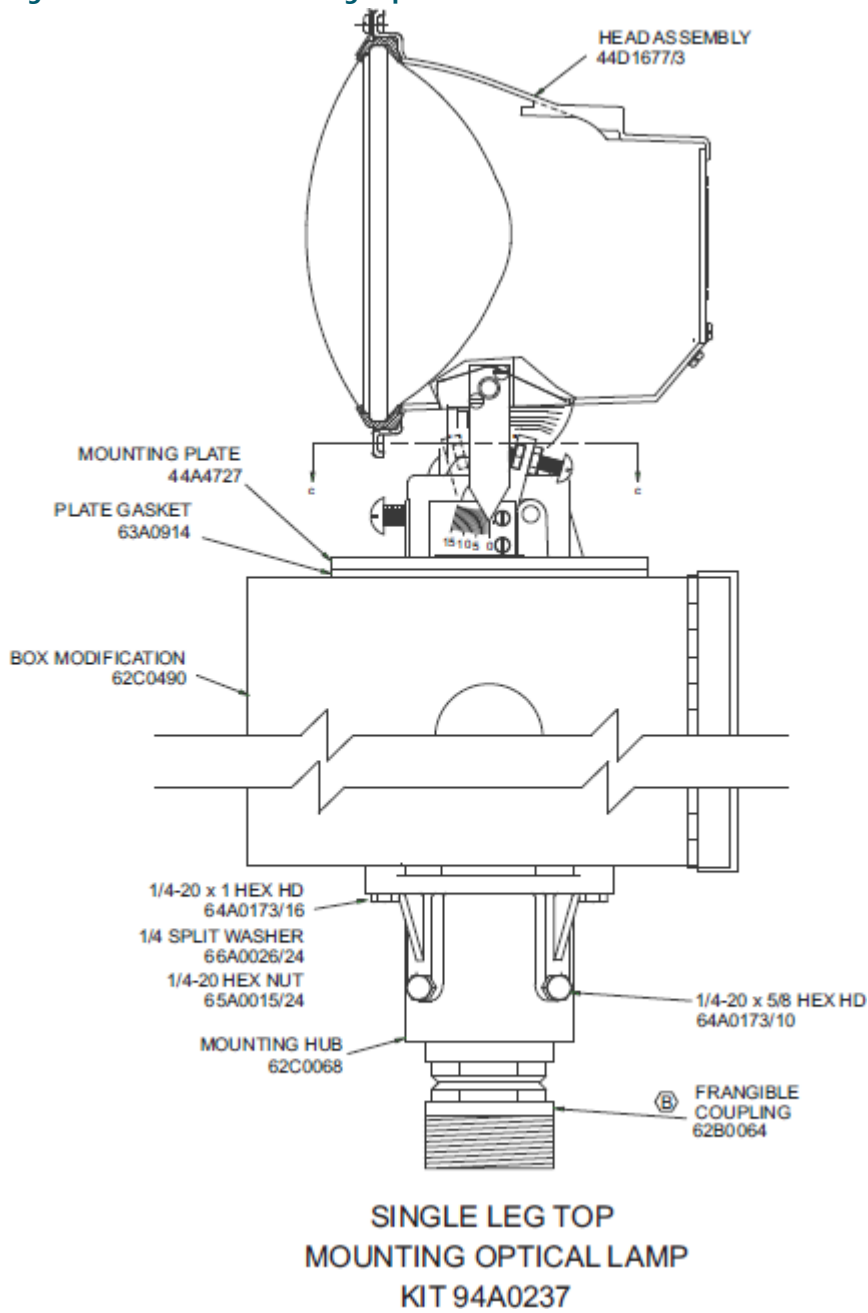
Final Assembly	Master Panel Assembly	Slave Panel Assembly
44A1161-66	44D1117-38	44D1117-32
44A1161-75	44D1117-39	44D1117-30
44A1161-76	44D1117-40	44D1117-32

Figure 30: Primary or Secondary Panel Assy NO.

Primary or Secondary Panel Assy NO.

		STYLE	Primary or Secondary	ITEM NO.	PANEL ASSY	DESCRIPTION	QTY		
WITHOUT POWER ADAPTER INPUT	W/O CURRENT SENSE	HIGH INTENSITY	A	44D1117-1	3	44D1158-11	Primary PANEL ASSY	1	
			WHOUR METER	44D1117-2	3	44D1158-21	Secondary PANEL ASSY	1	
			WHOUR METER	44D1117-3	3	44D1158-12	Primary PANEL ASSY	1	
		LOW INTENSITY	WHOUR METER	44D1117-4	3	44D1158-22	Secondary PANEL ASSY	1	
			WHOUR METER	44D1117-5	3	44D1159-11	Primary PANEL ASSY	1	
			WHOUR METER	44D1117-6	3	44D1159-21	Secondary PANEL ASSY	1	
	3 STEP INTENSITY LOW-MED-HIGH	WHOUR METER	44D1117-7	3	44D1159-12	Primary PANEL ASSY	1		
		WHOUR METER	44D1117-8	3	44D1159-22	Secondary PANEL ASSY	1		
		WHOUR METER	44D1117-9	3	44D1160-11	Primary PANEL ASSY	1		
	WITH POWER ADAPTER INPUT	W/O CURRENT SENSE	HIGH INTENSITY	E	44D1117-10	3	44D1160-21	Secondary PANEL ASSY	1
				WHOUR METER	44D1117-11	3	44D1160-12	Primary PANEL ASSY	1
				WHOUR METER	44D1117-12	3	44D1160-22	Secondary PANEL ASSY	1
LOW INTENSITY			ⓐ A	44D1117-13	3	44D1158-31	Primary PANEL ASSY	1	
			WHOUR METER	44D1117-14	3	44D1158-32	Primary PANEL ASSY	1	
			ⓑ C	44D1117-15	3	44D1159-31	Primary PANEL ASSY	1	
3 STEP INTENSITY LOW-MED-HIGH		WHOUR METER	44D1117-16	3	44D1159-32	Primary PANEL ASSY	1		
		ⓑ C	44D1117-17	3	44D1160-31	Primary PANEL ASSY	1		
		WHOUR METER	44D1117-18	3	44D1160-32	Primary PANEL ASSY	1		
1 STEP, CURRENT SENSE 1 STEP, CURRENT SENSE 1 STEP, CURRENT SENSE 1 STEP, CURRENT SENSE 1 STEP, CURRENT SENSE 1 STEP, CURRENT SENSE 3 STEP, CURRENT SENSE 3 STEP, CURRENT SENSE		HIGH INTENSITY	E	WHOUR METER	44D1117-19	3	44D1160-41	Primary PANEL ASSY	1
				WHOUR METER	44D1117-20	3	44D1160-42	Primary PANEL ASSY	1
				WHOUR METER	44D1117-21	3	44D1158-13	Primary PANEL ASSY	1
	LOW INTENSITY	A	WHOUR METER	44D1117-22	3	44D1158-23	Secondary PANEL ASSY	1	
			WHOUR METER	44D1117-23	3	44D1158-14	Primary PANEL ASSY	1	
			WHOUR METER	44D1117-24	3	44D1158-24	Secondary PANEL ASSY	1	
1 STEP, CURRENT SENSE 1 STEP, CURRENT SENSE 1 STEP, CURRENT SENSE 1 STEP, CURRENT SENSE 1 STEP, CURRENT SENSE 1 STEP, CURRENT SENSE 3 STEP, CURRENT SENSE 3 STEP, CURRENT SENSE	3 STEP INTENSITY LOW-MED-HIGH	C	WHOUR METER	44D1117-25	3	44D1159-13	Primary PANEL ASSY	1	
			WHOUR METER	44D1117-26	3	44D1159-23	Secondary PANEL ASSY	1	
			WHOUR METER	44D1117-27	3	44D1159-14	Primary PANEL ASSY	1	
	1 STEP, CURRENT SENSE 1 STEP, CURRENT SENSE 1 STEP, CURRENT SENSE 1 STEP, CURRENT SENSE 1 STEP, CURRENT SENSE 1 STEP, CURRENT SENSE 3 STEP, CURRENT SENSE 3 STEP, CURRENT SENSE	LOW INTENSITY	E	WHOUR METER	44D1117-28	3	44D1159-24	Secondary PANEL ASSY	1
				WHOUR METER	44D1117-29	3	44D1160-13	Primary PANEL ASSY	1
				WHOUR METER	44D1117-30	3	44D1160-23	Secondary PANEL ASSY	1
1 STEP, CURRENT SENSE 1 STEP, CURRENT SENSE 1 STEP, CURRENT SENSE 1 STEP, CURRENT SENSE 1 STEP, CURRENT SENSE 1 STEP, CURRENT SENSE 3 STEP, CURRENT SENSE 3 STEP, CURRENT SENSE	3 STEP INTENSITY LOW-MED-HIGH	A	WHOUR METER	44D1117-31	3	44D1160-14	Primary PANEL ASSY	1	
			WHOUR METER	44D1117-32	3	44D1160-24	Secondary PANEL ASSY	1	
			WHOUR METER	44D1117-33	3	44D1158-33	Primary PANEL ASSY	1	
	1 STEP, CURRENT SENSE 1 STEP, CURRENT SENSE 1 STEP, CURRENT SENSE 1 STEP, CURRENT SENSE 1 STEP, CURRENT SENSE 1 STEP, CURRENT SENSE 3 STEP, CURRENT SENSE 3 STEP, CURRENT SENSE	LOW INTENSITY	C	WHOUR METER	44D1117-34	3	44D1158-34	Primary PANEL ASSY	1
				WHOUR METER	44D1117-35	3	44D1159-33	Primary PANEL ASSY	1
				WHOUR METER	44D1117-36	3	44D1159-34	Primary PANEL ASSY	1
1 STEP, CURRENT SENSE 1 STEP, CURRENT SENSE 1 STEP, CURRENT SENSE 1 STEP, CURRENT SENSE 1 STEP, CURRENT SENSE 1 STEP, CURRENT SENSE 3 STEP, CURRENT SENSE 3 STEP, CURRENT SENSE	3 STEP INTENSITY LOW-MED-HIGH	E	WHOUR METER	44D1117-37	3	44D1160-33	Primary PANEL ASSY	1	
			WHOUR METER	44D1117-38	3	44D1160-34	Primary PANEL ASSY	1	
			WHOUR METER	44D1117-39	3	44D1160-43	Primary PANEL ASSY	1	
	1 STEP, CURRENT SENSE 1 STEP, CURRENT SENSE 1 STEP, CURRENT SENSE 1 STEP, CURRENT SENSE 1 STEP, CURRENT SENSE 1 STEP, CURRENT SENSE 3 STEP, CURRENT SENSE 3 STEP, CURRENT SENSE	LOW INTENSITY	A	WHOUR METER	44D1117-40	3	44D1160-44	Primary PANEL ASSY	1
				WHOUR METER					
				WHOUR METER					

Figure 31: REIL Side View using Top Mount Kit



8.2 L-849A/C/E Panel Assembly Master/Slave Parts List

See Figure 32 thru Figure 35 .



Note

Figure 33 shows only the L-849E REIL Master. Figure 35 shows only the L-849A REIL slave. The L-849C REIL will have different part locations.

Item	Description	Part Number	Quantity	Note
1	Capacitor 0.47 μ F, 2000 Vac, L-849A/E	20A0013	See note.	A
2	Bracket, capacitor, L-849A/C/E	61B0145-68	See note.	B
3	Relay, DPDT, coil, 120 Vac, L-849E only			
	Relay, with power adapter	53A0257	See note.	B, F
	Relay, without power adapter	53A0182	See note.	B
4	Master oscillator PCB assembly (Master only)			
	Master oscillator PCB assembly, L-849A/C	44B1156	1	D
	Master oscillator PCB assembly, L-849E	44B1157	1	D
5	Resistor, 10 Ω , 6.5 W, L-849A/C/E	15A0199	See note.	A
6	Component mounting block, L-849A/C/E	72A0011	See note.	A
7	Current sensing PCB, L-849E, Master only			
	L-849 E	44D1988/2100	1	
	L-849 A/C	44D1988/1100	1	
8	Rotary switch, L-849E, Master only	46A0023	1	
9	Hourmeter, L-849A/C/E	52A0100	See note.	A
10	Input module			
	Input module, L-849A/C	44B1162	See note.	A
	Input module, L-849E	44B1163	See note.	A
11	Neon lamp, L-849E, Master only	48A0048-5	See note.	B
12	Switch, L-849A/C/E	45A0267	See note.	A
13	Fuse, 4A, Slo-Blo, L-849A/C/E	47A0078	See note.	B
14	Relay, 110 Vdc, 15 A, DPDT, with power adapter, L-849A/C/E	53A0261	See note.	B
15	Fuseholder, L-849A/C/E	49A0040	See note.	C
16	Fuse, 1.5 A, Slo-Blo, L-849E, Master only	47A0027	1	

Item	Description	Part Number	Quantity	Note
17	Socket, relay, L-849A/C/E	49A0075	See note.	A
18	Relay, 120 Vac, DPDT, L-849A/C/E	53A0260	See note.	A
19	Spring, relay retaining, L-849A/C/E	49A0076	See note.	B
20	Varistor			
	Varistor, L-849A/C/E (60 Hz)	32A0011	See note.	B
	Varistor, L-849A/C/E (50 Hz)	32A0032	See note.	B
21	Ground lug, L-849A/C/E	72A0010	See note.	A
22	Terminal block, L-849E	72A0066	See note.	C
23	Terminal block end piece, L-849E	72A0067	See note.	A
24	Trigger interface PCB assembly, L-849A/C/E	44B1105	See note.	A
25	Standoff, brass, L-849A/C/E	66A0068-6	See note.	A
26	Standoff, ceramic, L-849A/C/E	66A0067-20	See note.	A
27	Resistor mounting block assembly, L-849A/C/E	44B1165	See note.	A
28	Resistor 1 k Ω , 100 W, L-849A/C/E	1000C1001W5A	See note.	A
29	Bracket, resistor, L-849A	61A0194	See note.	A
30	Lightning arrestor	32A0011	See note.	A
31	Component mounting block assembly, L-849A/C/E	44B1164	See note.	A
32	Terminal block, L-849A/C/E	72A0047-6	See note.	E
33	Transformer			
	Transformer, L-849A/C/E (60 Hz)	35C0140	See note.	A
	Transformer, L-849A/C/E (50 Hz)	35A0294	See note.	A
34	Bracket, capacitor			
	Bracket, capacitor, L-849A/C	60B0539	See note.	B
	Bracket, capacitor, L-849E	60B0538	See note.	B
35	Capacitor			
	Capacitor, 23 μ F, 2500 Vdc, L-849E, Master	20A0020	See note.	A
	Capacitor 27 μ F, 2500 Vdc, L-849A, Slave	20A0021	See note.	A
36	Resistor 22 M Ω , 1/2 W, L-849E	R500M2205C54	See note.	B

Parts

Item	Description	Part Number	Quantity	Note
37	Capacitor 2.75 μ F, 2500 Vdc, L-849E	20A0024	See note.	B
38	Bracket, capacitor, L-849E	61B0145-76	See note.	B
39	Bracket, capacitor, L-849E	61B0145-50	See note.	B
40	Capacitor, 1.25 μ F, 2500			
	Capacitor, 1.25 μ F, 2500, L-849E	20A0023	See note.	A
	Capacitor, 1.25 μ F, 2500, L-849A/C	20A0022	See note.	A
41	Resistor			
	Resistor, 3.3 Ω , 2 W, L-849E	2R00C3304M55	See note.	A
	Resistor, 2.7 M Ω , 2 W, L-849A	2R00C2704M55	See note.	A
NS	Power Transformer, L-849A/C/E (50 Hz), Master only	35A0474	1	

NOTE A: Master has quantity of 1; slave has quantity of 1. NOTE B: Master has quantity of 2; slave has quantity of 2.

NOTE B: Master has quantity of 2; slave has quantity of 2.

NOTE C: On L-849A/C, Master has quantity of 2; slave has quantity of 2. On L-849E, Master has quantity of 3; slave has a quantity of 2. NOTE D: See Schematic 43B0637 at end of Section 8

NOTE D: See Schematic 43B0637 at end of Section 8

NOTE E: On L-849A/C, Master has quantity of 18; slave has quantity of 12. On L-849E, Master has quantity of 6; slave has quantity of 6.

NOTE F: To replace obsolete relay Part Number 53A0257, order DC relay kit Part Number 94A0602. This kit includes two 53A0182 relays to replace the 53A0257 relays and a new 44A7196 PCB to replace the existing 44B1781 PCB.

Figure 32: L-849E Panel Assembly Master (1 of 2)

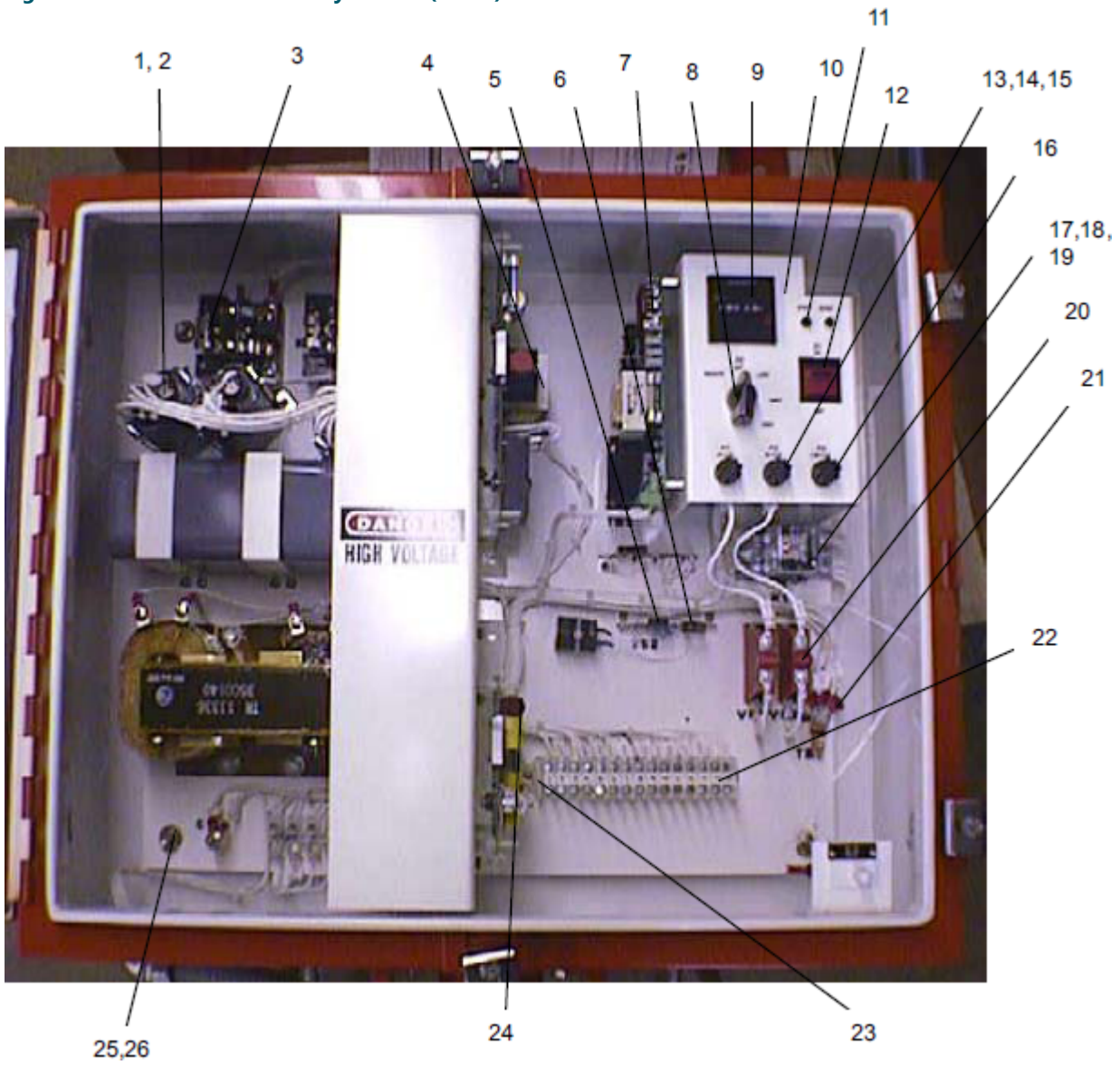


Figure 33: L-849E Panel Assembly Master (2 of 2)

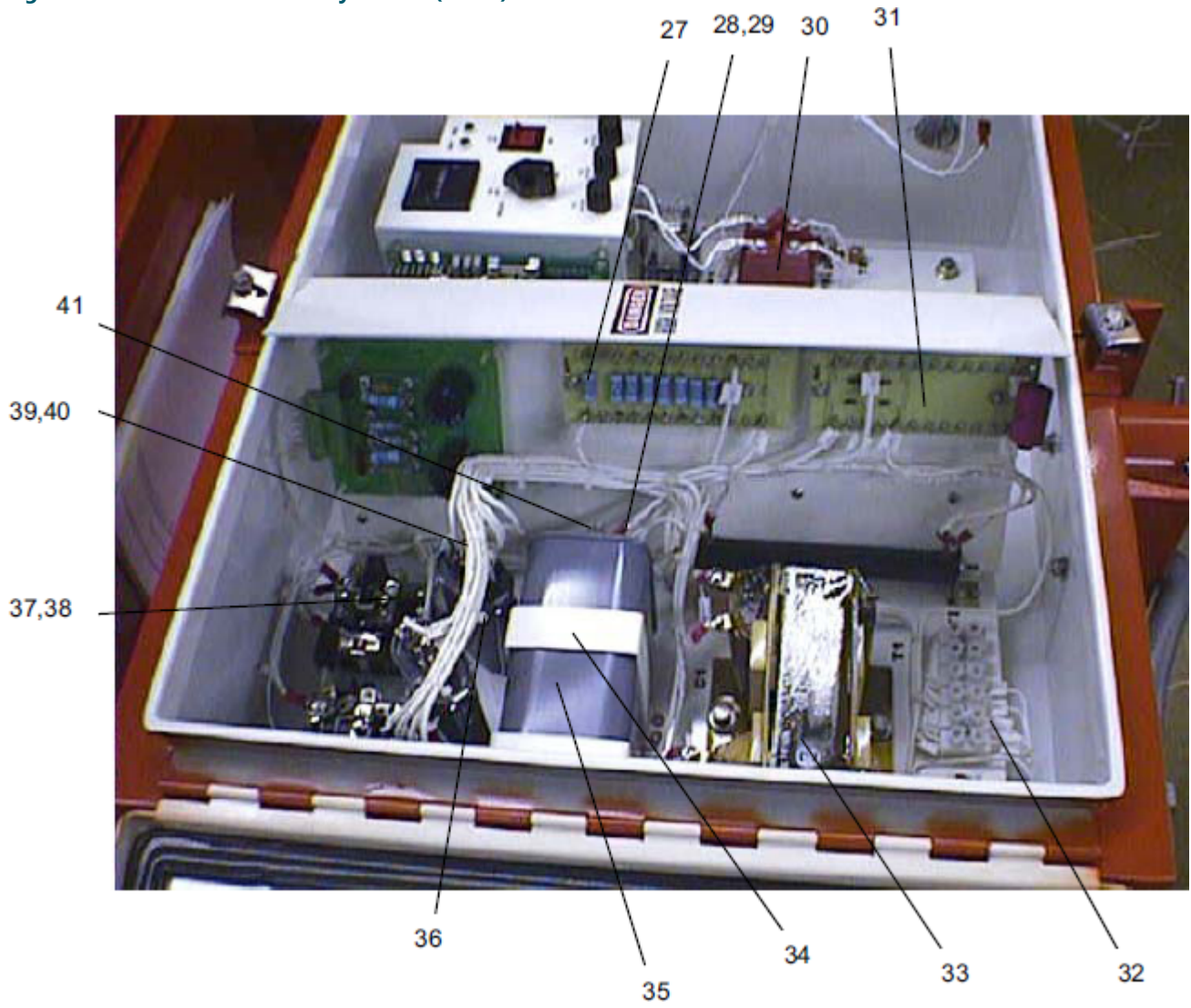


Figure 34: L-849A Panel Assembly Slave (1 of 2)

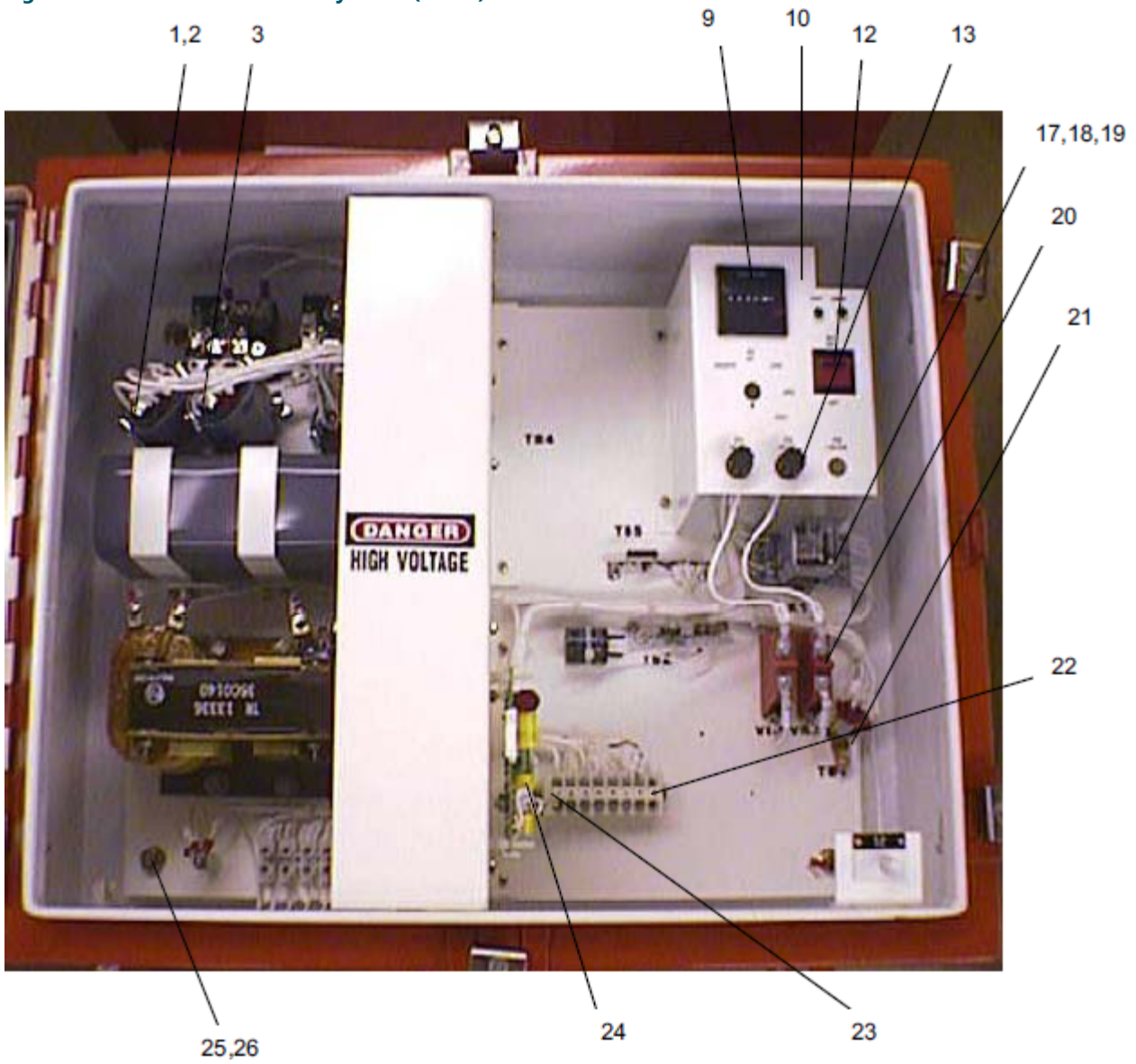
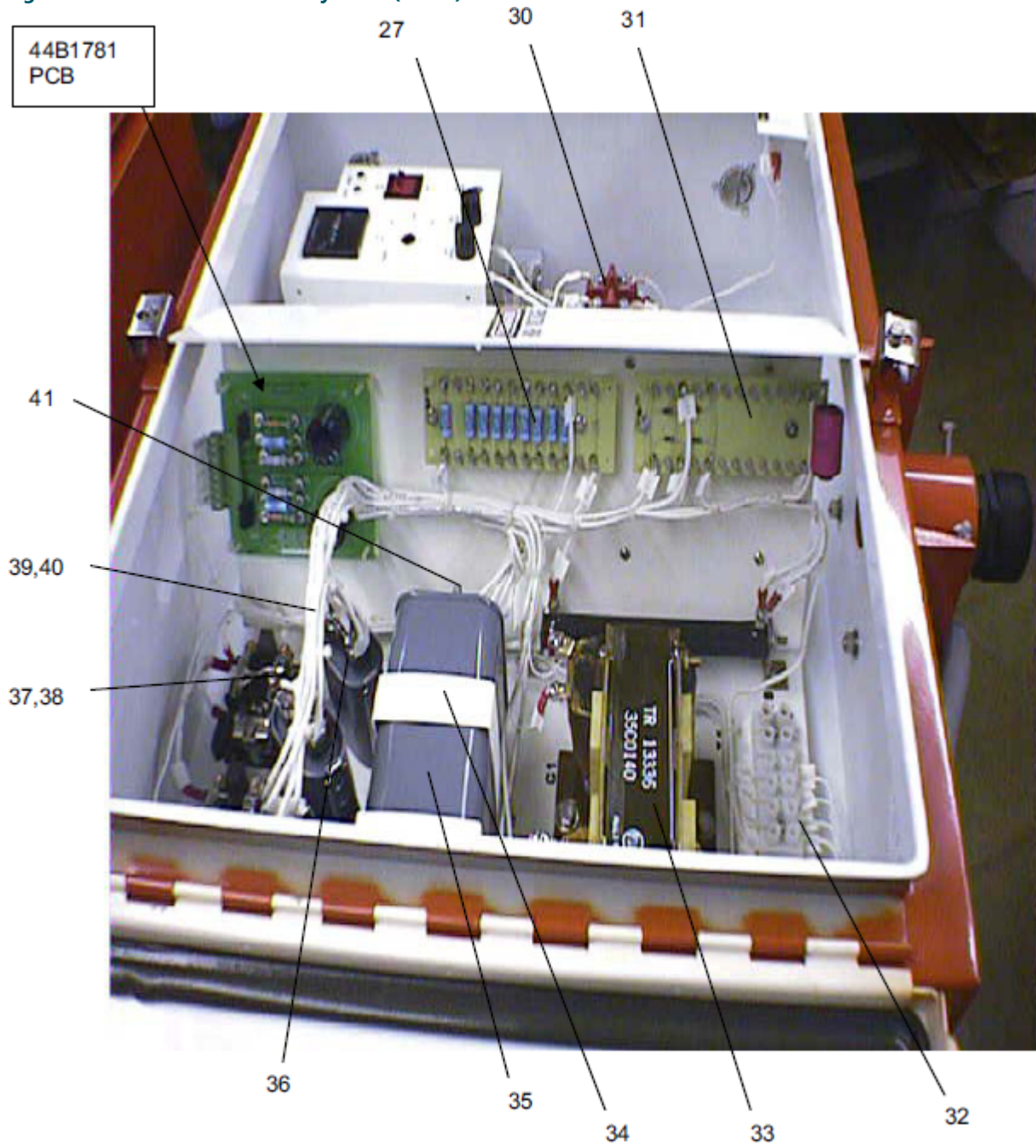


Figure 35: L-849A Panel Assembly Slave (2 of 2)

44B1781
PCB



8.3 Complete REIL Assembly Parts List

This subsection provides parts lists for L-849 REIL final assemblies for all options.

8.3.1 L-849 Kit (Standard Mounting Configuration, Single and Dual Leg) Parts List

This subsection provides parts lists for L-849 REIL final assemblies for all options.

See [Figure 36](#) . The L-849 kit part number for the standard mounting configuration single leg is 94A0238. The L-849 kit part number for the standard mounting configuration dual leg is

94A0205. The standard mounting configuration is FAA approved.



Note

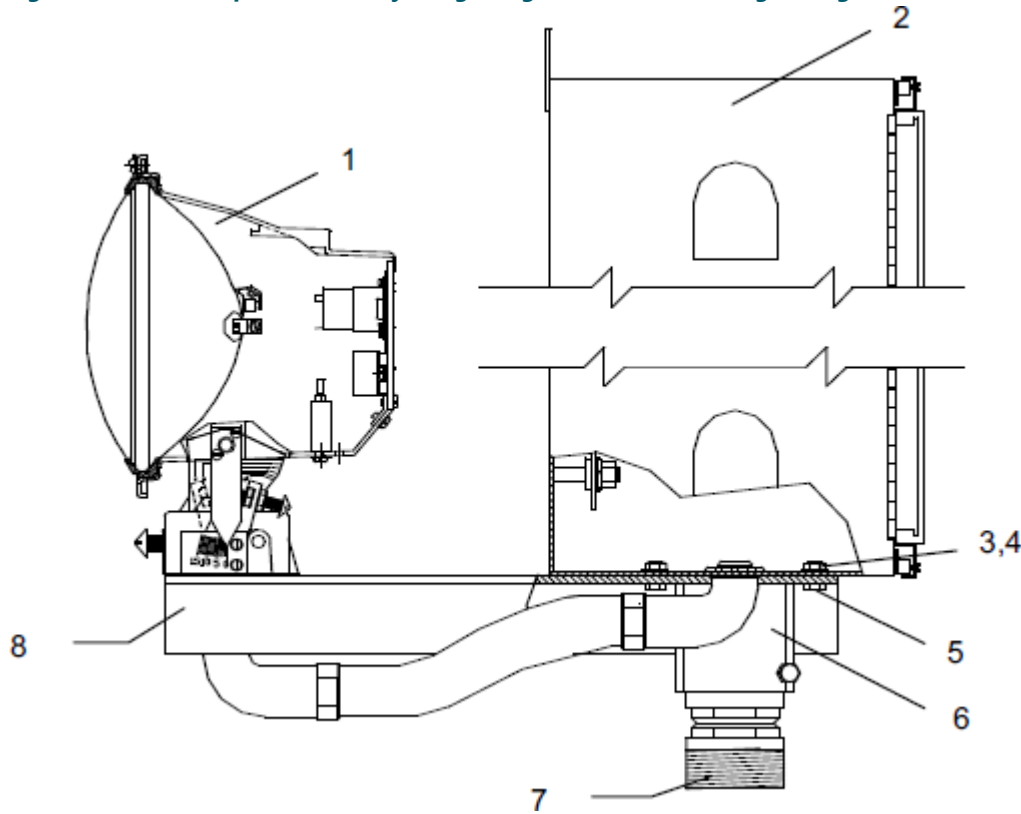
[Figure 36](#) shows the single leg standard mounting configuration. [Figure 36](#) also applies to the dual leg standard mounting configuration.

Item	Description	Part Number	Quantity	Note
1	Head assembly	44D1677-3	1	
2	Control cabinet	62C0490	1	
3	Nut, hex, 1/4–20	65A0015-24	4	
4	¼ split washer	66A0026-24	4	
5	Screw, hex head, 1/4–20 x 1	64A0173-16	4	
6	Frangible coupling	62B0064	1	A
7	Screw, hex head, 1/4–20 x 5/8	64A0173-10	2	

Item	Description	Part Number	Quantity	Note
	Leg assembly			
8	Single leg (standard)	44A4751	1	
	Dual leg	44C1762	1	

NOTE A: The dual leg has 2 frangible couplings.

Figure 36: REIL Complete Assembly (Single Leg, Standard Mounting Configuration)



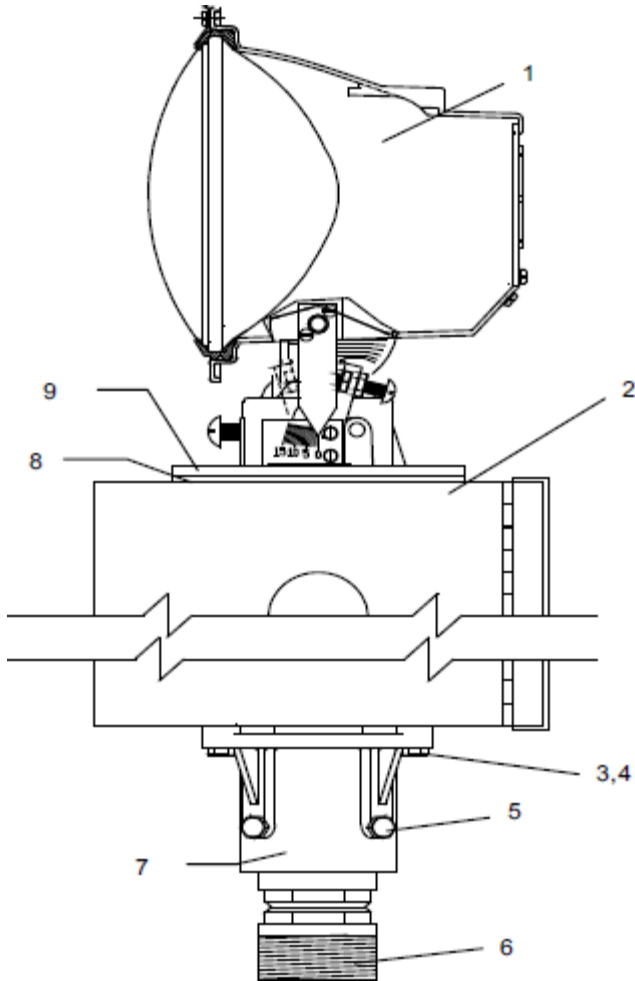
8.3.2 L-849 Kit (Single Leg Top Mounting Optical Lamp) Parts List

See [Figure 37](#) . The single leg top mounting optical lamp kit part number is 94A0237. This kit is not FAA approved.

Item	Description	Part Number	Quantity	Note
1	Head assembly	44D1677-3	1	
2	Control cabinet	62C0490	1	
3	Screw, hex head, 1/4-20 x 1	64A0173-16	4	
4	¼ split washer	66A0026-24	4	
5	Screw, hex head, 1/4-20 x 1	64A0173-12	4	
6	Frangible coupling	62B0064	1	

Item	Description	Part Number	Quantity	Note
7	Plate gasket	63A0914	1	
8	Mounting plate	44A4727	1	
9	Mounting hub	62C0068	1	

Figure 37: L-849 REIL Single Leg Top Mounting Optical Lamp Kit



8.3.3 Head Mounted on Extension (Single and Dual Leg) Kit Parts List

See [Figure 38](#) . The kit part number for the single leg with head mounted on extension is 94A0233. The kit part number for the dual leg with head mounted on extension is 94A0236. This kit is not FAA approved.



Note

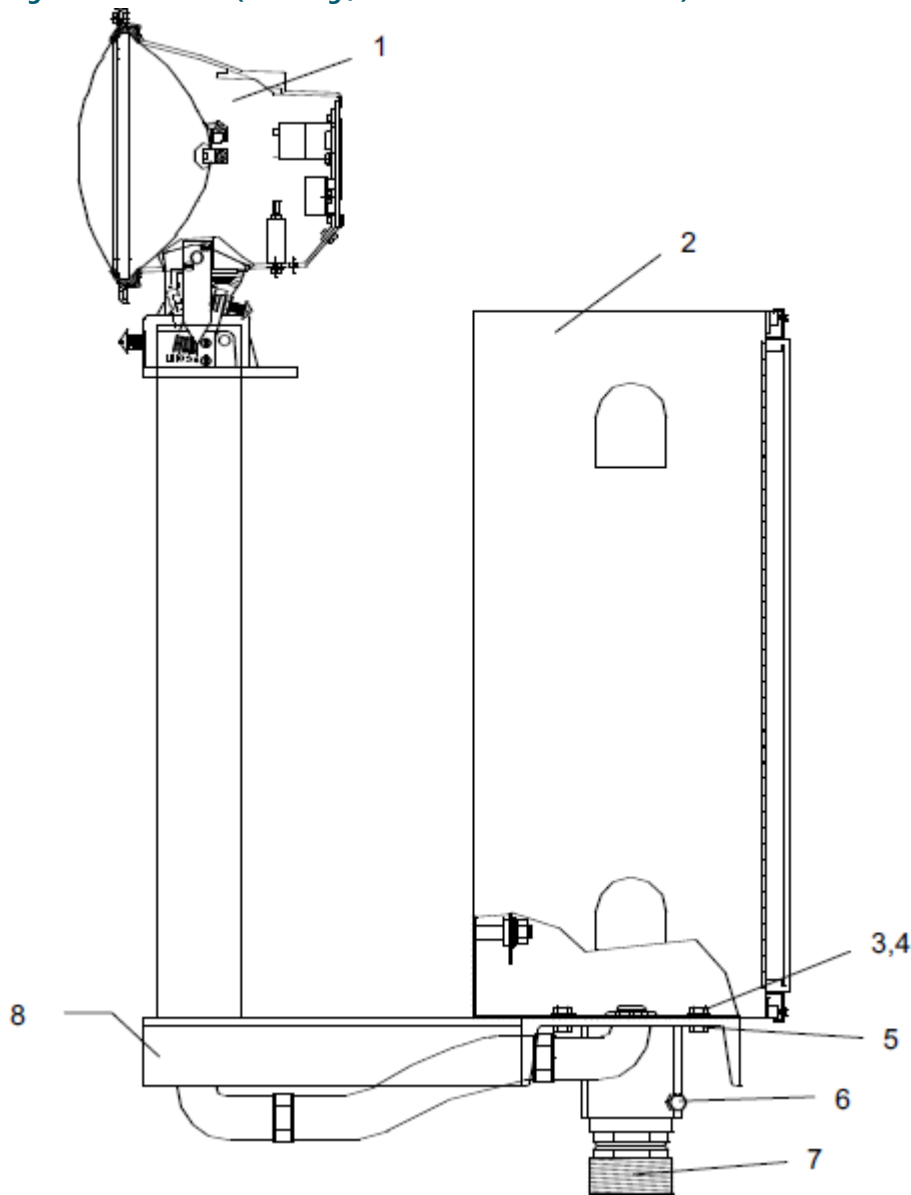
[Figure 38](#) shows the dual-leg mounting option. [Figure 37](#) also applies to the single leg mounting option.

Item	Description	Part Number	Quantity	Note
1	Head assembly	44D1677-3	1	
2	Control cabinet	62C0490	1	
3	Nut, hex, 1/4–20	65A0015-24	4	
4	¼ split washer	66A0026-24	4	
5	Screw, hex head, 1/4–20 x 1	64A0173-16	4	

Parts

Item	Description	Part Number	Quantity	Note
6	Screw, hex head, 1/4-20 x 1	64A0173-12	4	
7	Frangible coupling	62B0064	1	
8	Post weldment assembly		1	
	Single leg	44A4751		
	Dual leg	44A4756		

Figure 38: L-849 Kit (Dual Leg /Head Mounted on Extension)

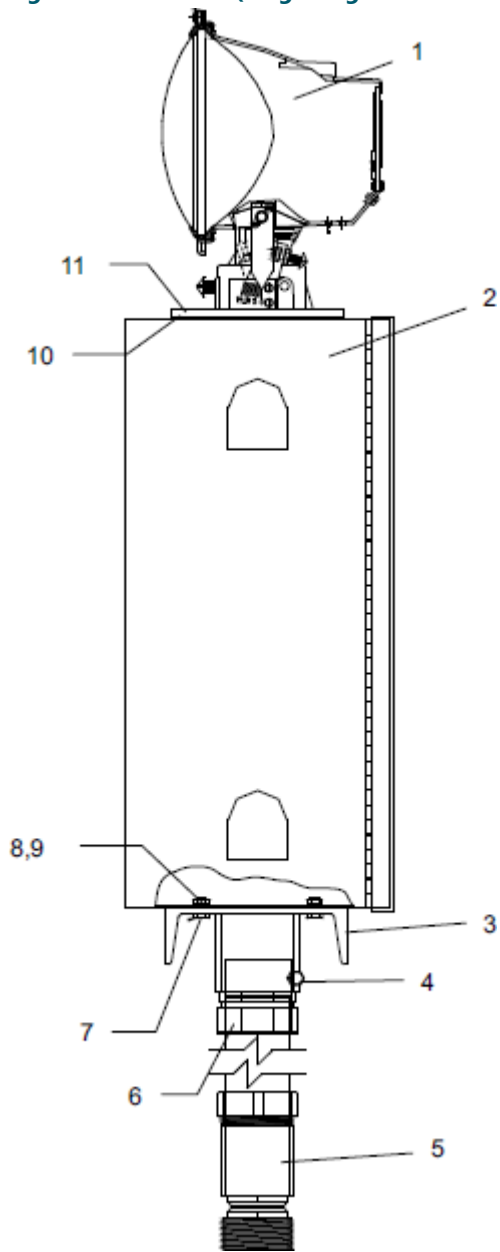


8.3.4 L-849 Kit (Single Leg with Head Mounted on Top of Cabinet) Parts List

See [Figure 39](#) . The kit part number for the single leg with head mounted on top of the cabinet is 94A0239. This kit is not FAA approved.

Item	Description	Part Number	Quantity	Note
1	Head assembly	44D1677-3	1	
2	Control cabinet	62C0490	1	
3	Base weldment	44A4757	1	
4	Screw, hex head, 1/4–20 x 1	64A0173-12	4	
5	Frangible coupling	44B0180	1	
6	Compression coupling	77A0009	1	
7	Screw, hex head, 1/4–20 x 1	64A0173-16	4	
8	Nut, hex, 1/4–20	65A0015-24	4	
9	¼ split washer	66A0026-24	4	
10	Plate gasket	63A0914	1	
11	Mounting plate	44A4727	1	

Figure 39: L-849 Kit (Single Leg with Head Mounted on Top of Cabinet)



8.4 Head Assembly Parts List

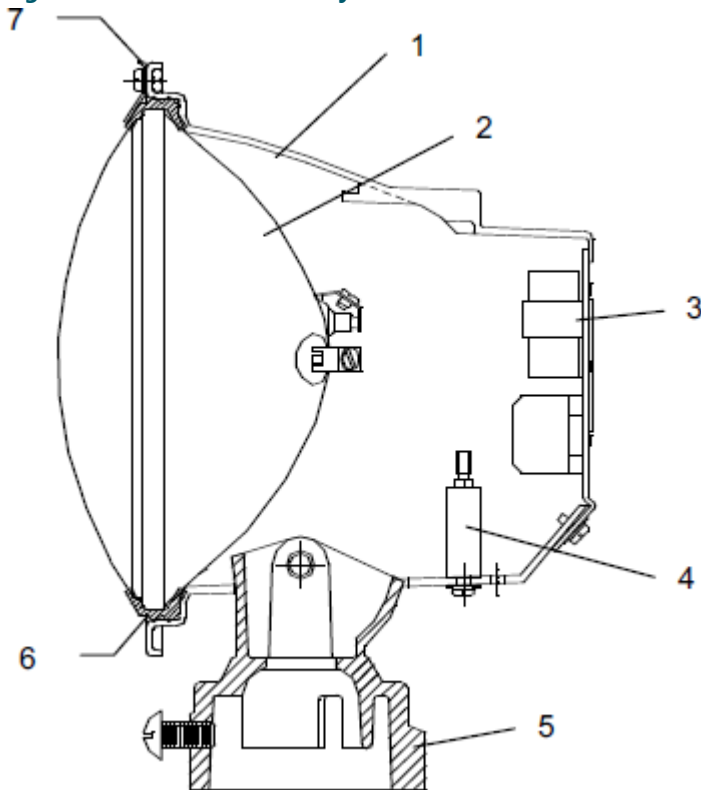
See [Figure 40](#) . The REIL head assembly part number is 44D1677-3.

Item	Description	Part Number	Quantity	Note
1	Multi-purpose head	88D0518	1	
2	Flashing lamp	48B0022	1	
3	Trigger transformer assembly		1	
	Trigger transformer assembly without mounting backplate	44B1780-4		

Item	Description	Part Number	Quantity	Note
	Trigger transformer assembly with mounting backplate	44B1780-2	1	
4	HV standoff	66A0067-20	1	
5	Slip fitter, 1-1/2 tower	62D0524/1P	1	
6	Lamp gasket	63C0532	1	
7	Lamp clip	60B0900	3	
NS	Interlock switch	45A0297	1	

NS: Not Shown

Figure 40: REIL Head Assembly



8.5 Baffle Retrofit Kit Parts List

For Baffle Retrofit Kit parts, refer to *Installing Baffles* in the *Installation* section.

8.6 Recommended Spare Parts

See [Figure 32](#) thru [Figure 35](#) . Refer below for recommended spare parts.

Item	Description	Part Number	Quantity	Note
3	Relay, DPDT, coil, 120 Vac, L-849E only			
	Relay, with power adapter	53A0257	See note.	A, D
	Relay, without power adapter	53A0182	See note.	A
4	Master oscillator PCB assembly		1	C
	Master oscillator PCB assembly, L-849A/C	44B1156		
	Master oscillator PCB assembly, L-849E	44B1157		
7	Current sensing PCB, three-step, L-849E, Master only	44D1988-2100	1	
10	Input module			
	Input module, L-849A/C	44B1162S	1	
	Input module, L-849E	44B1163S	1	
13	Fuse, 4A, Slo-Blo	47A0078	2	
14	Relay, 110 Vdc, 15 A, DPDT (for REIL with power adapter)	53A0261		
16	Fuse, 1.5 A, Slo-Blo, L-849E, Master only	47A0027	1	
18	Relay, 120 Vac, DPDT (for REIL without power adapter option)	53A0260		
24	Trigger interface PCB assembly	44B1105	1	
27	Resistor mounting block assembly, L-849A/C/E	44B1165	See note.	B
30	Lightning arrestor	32A0011	See note.	B
31	Component mounting block assembly, L-849A/C/E	44B1164	See note.	B
NS	Trigger transformer assembly without mounting backplate	44B1780-4	1	
NS	Current sensing assembly (for REIL with 1-step sensing option)	44D1988-1100	1	

Item	Description	Part Number	Quantity	Note
NS	Flashing lamp	48B0022	1	
NS	Lamp gasket	63C0532	1	

NOTE A: Master has quantity of 2; slave has quantity of 2. NOTE B: Master has quantity of 1; slave has quantity of 1. NOTE C: See Schematic 43B0637 at end of Section 8.

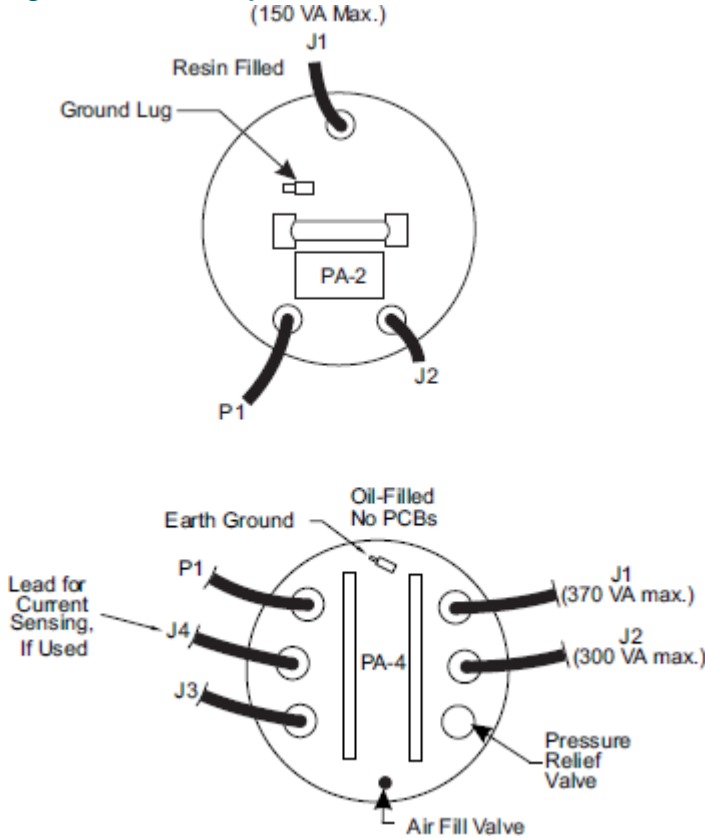
NOTE B: Master has quantity of 1; slave has quantity of 1.

NOTE C: See Schematic 43B0637 at end of Section 8.

NOTE D: To replace obsolete relay Part Number 53A0257, order DC relay kit Part Number 94A0602. This kit includes two 53A0182 relays to replace the 53A0257 relays and a new 44A7196 PCB to replace the existing 44B1781 PCB.

NS: Not Shown

Figure 41: Power Adapters PA2 and PA4



See [Wiring Schematics](#) on page 40 for the wiring diagrams.

8.7 Possible Spares

Table 22: Parts

Description	Part No.
Current sensing assembly, one-step	44D1988-1100
Current sensing assembly, three-step	44D1988-2100
Fuse, 4 A, slow blow, 125 V	47A0078
Fuse, 1.5 A, slow blow, 250 V	47A0030
High-voltage diode assembly	44B1164
Lamp gasket	63C0532
Lighting arrester, 150 VAC	32A0011
Master oscillator PCB ass'y, L-849 Style E	44B1157
Master oscillator PCB ass'y, L-849 Style A/C	44B1156
PAR-56 xenon flash lamp	48B0022
Relay, intensity switching, DPDT, 120 VAC,	53A0182 without power adapter
Relay, intensity switching, DPDT, 110 VDC with power adapter	See note
Relay, input power switching, DPDT, 120 VAC 53A0260 without power adapter	
Relay, input power switching, DPDT, 110 VDC 53A0261 with power adapter	
Resistor mounting block assembly	44B1165
Trigger transformer assembly	44B1780-4
Trigger interface PCB	44B1105

Notes

- ¹ To replace obsolete relay Part No. 53A0257, order DC Relay Kit Part No. 94A0602. This kit includes two 53A0182 relays to replace the 53A0257 relays and a new 44A7196 PCB to replace the existing 44B1781 PCB. Both old relays and the existing 44B1781 PCB must be replaced at the same time. The relays and PCB are direct replacements; no wiring changes are needed.

Appendix A: SUPPORT

Our experienced engineers are available for support and service at all times, 24 hour/7 days a week. They are part of a dynamic organization making sure the entire ADB Safegate is committed to minimal disturbance for airport operations.

Table 23: ADB Safegate Support

Live Technical Support - Americas

If at any time you have a question or concern about your product, just contact ADB's technical service department. Trained in all areas of system issues, troubleshooting, quality control and technical assistance, our highly experienced Technical support specialists are available 24 hours a day, seven days a week to provide assistance over the phone.

ADB SAFEGATE Americas Technical Service & Support (US & Canada): +1-800-545-4157

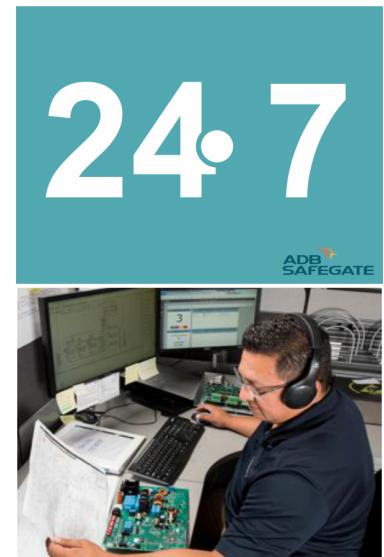
ADB SAFEGATE Americas Technical Service & Support (International): +1-614-861-1304

During regular business hours, you can also [Chat with a Service Technician](#). We look forward to working with you!

Before You Call

When you have an airfield lighting or system control system problem it is our goal to support airfield maintenance staff as quickly as possible. To support this effort we ask that you have the following information ready before calling.

- The airport code
- If not with an airport, then company name (prefer customer id number)
- Contact phone number and email address
- Product with part number preferable or product number
- Have you reviewed the product's manual and troubleshooting guide
- Do you have a True RMS meter available (and any other necessary tools)
- Be located with the product ready to troubleshoot



Note

For more information, see www.adbsafegate.com, or contact ADB Safegate Support via email at support@adbsafegate.com or

Brussels: +32 2 722 17 11

Europe: +46 (0) 40 699 17 40

Americas: +1 614 861 1304. Press 3 for technical service or press 4 for sales support.

China: +86 (10) 8476 0106

A.1 ADB Safegate website

The ADB Safegate website, www.adbsafegate.com, offers information regarding our airport solutions, products, company, news, links, downloads, references, contacts and more.

A.2 Recycling

A.2.1 Local authority recycling

The disposal of ADB Safegate products is to be made at an applicable collection point for the recycling of electrical and electronic equipment. The correct disposal of equipment prevents any potential negative consequences for the environment and human health, which could otherwise be caused by inappropriate waste handling. The recycling of materials helps to conserve natural resources. For more detailed information about recycling of products, contact your local authority city office.

A.2.2 ADB Safegate recycling

ADB Safegate is fully committed to environmentally-conscious manufacturing with strict monitoring of our own processes as well as supplier components and sub-contractor operations. ADB Safegate offers a recycling program for our products to all customers worldwide, whether or not the products were sold within the EU.

ADB Safegate products and/or specific electrical and electronic component parts which are fully removed/separated from any customer equipment and returned will be accepted for our recycling program.

All items returned must be clearly labelled as follows:

- **For ROHS/WEEE Recycling**
- Sender contact information (Name, Business Address, Phone number).
- Main Unit Serial Number.

ADB Safegate will continue to monitor and update according for any future requirements for EU directives as and when EU member states implement new regulations and or amendments. It is our aim to maintain our compliance plan and assist our customers.

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