

TWR Lighting, Inc. **HARK**[®]

Enlightened Technology[®]

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IMPORTANT!!!!

PLEASE TAKE THE TIME TO FILL OUT THE FORM COMPLETELY. FILE IN A SAFE PLACE. IN THE EVENT YOU EXPERIENCE PROBLEMS WITH OR HAVE QUESTIONS CONCERNING YOUR CONTROLLER, THE FOLLOWING INFORMATION IS NECESSARY TO OBTAIN PROPER SERVICE AND PARTS.

MODEL # E-1DBSL

SERIAL # _____

PURCHASE DATE _____

PURCHASED FROM _____

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DUAL MEDIUM INTENSITY LED/STROBE MODEL E-1DBSL

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WARRANTY & RETURN POLICY

RETURN MERCHANDISE AUTHORIZATION (RMA) FORM

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APPENDIX

CHASSIS COMPONENT LAYOUT	H40-264 (REV S)
WIRING DIAGRAM.....	M01-264 (REV K)
HOUSING DETAIL	HD0-264 (REV D)
INSTALLATION GUIDELINE	INS-264 (REV A)
PHOTOCELL HOUSING DETAIL	100239i (REV H)
TOWER LIGHTING KIT 201' TO 350' CABLE.....	602 (REV E)
SIDELIGHT MOUNT ASSEMBLY.....	100489 (REV A)
TIMING/CONTROL PCB.....	H01-226B (REV F)
HIGH VOLTAGE RECTIFIER PCB	H02-226A (REV A)
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OL1VLED2 (L810 OBSTRUCTION LIGHT).....	100656i (REV E)
LED BEACON AND SIDELIGHT CURRENT SENSOR	101088 (REV B)
L865/864 LED DUAL BEACON ASSEMBLY	101008i (REV A)
JUNCTION BOX DETAIL.....	100089 (REV A)
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1.0 INTRODUCTION

The TWR Lighting[®], Inc. (TWR[®]) Model E-1DBSL Type L-864/L-865 Controller has been designed and built to the Federal Aviation Advisory Circular 150/5345-43G, with safety and reliability in mind. TWR[®] is committed to providing our customers with some of the best products and services available. TWR[®] welcomes you to our family of fine products and we look forward to servicing your needs now and in the future.

1.1 APPLICATION

The E-1DBSL Controller is for use on lighting structures or towers (201' to 350' AGL) that are approved to be lighted with Dual Red "LED"/ White "Strobe" Flashing Medium Intensity in accordance with the Federal Aviation Administration's (FAA) Advisory Circular 70/7460-1K.

1.2 SPECIFICATIONS OF EQUIPMENT

Dimensions:

Controller (H X W X D) / Weight	18.0" X 16.0" X 9.25" / 45.0 lbs
Mounting Dim (H X W)	18.74" X 12.0"
Beacon Height / Weight	27.0" / 80 lbs
Cable Diameter / Weight per 100 ft.	.625" +/- 10% 24 lbs

Electrical Voltage:

120V AC +/- 10% 60 Hz (Standard)
240V AC +/- 10% 60 Hz (Available)

Intensity:

White Daymode	20,000 +/- 25% Effective Candelas
Red Nightmode	2,000 +/- 25% Effective Candelas
White Nightmode (Back-up mode)	2,000 +/- 25% Effective Candelas

Beam Spread:

Horizontal	360°
Vertical	3° Minimum

Flash Rate:

White Daymode	40 fpm +/- 2 fpm
Red Nightmode	30 fpm +/- 2 fpm
White Nightmode (Back-up mode)	40 fpm +/- 2 fpm

Wattage:

Daymode	95 Watts
Red Nightmode	40 Watts
White Nightmode	35 Watts

Temperature:

+55°C / -55°C

Beacon Wind Load:

2.1 ft²

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2.0 INSTALLATION

WARNING DANGER!!!

THIS SYSTEM OPERATES AT HIGH VOLTAGE LEVELS THAT COULD BE LETHAL TO SERVICE PERSONNEL. ALL INSTALLATION AND MAINTENANCE WORK MUST BE DONE BY QUALIFIED SERVICE PERSONNEL ONLY. WHEN PERSONNEL IS INSTALLING SYSTEM OR PERFORMING MAINTENANCE ON THIS SYSTEM, MAKE SURE THE POWER IS TURNED OFF AT THE SERVICE BREAKER PANEL!!

READ AND UNDERSTAND THE THEORY OF OPERATION AND ITS SAFETY MESSAGES BEFORE ATTEMPTING INSTALLATION/MAINTENANCE OF THIS SYSTEM. DO NOT ATTEMPT TO DEFEAT THE INTERNAL SAFETY SWITCHES IN THE CONTROLLER AND STLD BEACON!!

2.1 POWER SUPPLY CONTROL CABINET MOUNTING

The power supply control cabinet can be located at the base of the structure or in an equipment building. Mounting dimensions can be found in Section 1.2, on page 1. Pay particular attention when choosing your controller mounting location to ensure proper door opening and room for service personnel. Refer to installation drawings INS-264, and HDO-264, for ease of install.

2.2 PHOTOCELL HOUSING

The standard photocell housing is supplied with a 20' pigtail of 16 AWG type TFFN wire. On occasion in mounting of the photocell an additional amount of wire may be required. Refer to drawing 100239, for proper assistance on determining gauge of wire for your specific needs.

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2.3 PHOTOCELL WIRING

(Refer to Drawings HDO-264 and H40-264)

If the control cabinet is mounted inside an equipment building, the photocell should be mounted vertically on ½" conduit outside the building above the eaves facing north. Wiring from the photocell housing socket to the control cabinet should consist of one (1) each; red, black, and white wires. The white wire is connected to the socket terminal marked "N," the black wire is connected to the socket terminal marked "Li," and the red wire is connected to the socket terminal marked "Lo." The photocell should be positioned so that it does not "see" ambient light, which would prevent it from switching to the nightmode. If the control cabinet is mounted outside an equipment building, the photocell should be mounted vertically on ½" conduit so the photocell is above the control cabinet. Care must be taken to assure that the photocell does not "see" any ambient light that would prevent it from switching into the nightmode. The photocell housing socket wiring is the same as above.

2.3.1 Connect the **BLACK** wire from the photocell to TB1-6.

2.3.2 Connect the **RED** wire from the photocell to TB1-7.

2.3.3 Connect the **WHITE** wire from the photocell to TB1-8.

2.3.4 Install the photocell into the receptacle and twist to the right while depressing to lock into place.

2.4 POWER WIRING

(Refer to Drawing H40-264)

Power wiring to the control cabinet should be in accordance with local methods and the National Electric Codes (NEC).

2.4.1 A 15 amp circuit breaker is recommended at service panel.

2.4.2 Connect the **"HOT"** side of the 120V AC line to TB1-9.

2.4.3 Connect the **"NEUTRAL"** side of the 120V AC line to TB1-10.

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- 2.4.4 Connect the AC ground to the ground stud to the lower right of the terminal block TB1.
- 2.4.5 Controller panel should be connected to the tower and/or building grounding system with the exception of installations on AM RF applications where controller grounding to earth ground is prohibited. Ground the controller only to the tower itself using a suitable RF ground.

2.5 TOWER LIGHTING KIT

When installing this system, the customer will need to use strobe cable wiring method to wire the STLD BEACON2A. Refer to tower kit drawing 602, for cable installations.

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READ AND UNDERSTAND THE THEORY OF OPERATION AND ITS SAFETY MESSAGES BEFORE ATTEMPTING INSTALLATION/MAINTENANCE OF THIS SYSTEM. DO NOT ATTEMPT TO DEFEAT THE INTERNAL SAFETY SWITCHES IN THE CONTROLLER AND STLD BEACON2A!!

2.5.1 LED Red Beacon Mounting and Wiring (Refer to Drawings HDO-264, and INS-264)

- 2.5.1.1 Bolt the STLD BEACON2A to the mounting plate using four 5/8" x 1 1/4" galvanized bolts that are supplied. Installer should make sure to check for full thread engagement on Anco locknut. Allow 16" clearance in back of the hinge (25" from the center of the base) to tilt lens back without hitting an obstruction.

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- 2.5.1.2 Level the STLD BEACON2A using the spirit level at the base of the lens. Shims may be used under beacon base or triple nutting each bolt with palnuts on all four (4) nuts.
- 2.5.1.3 Slip the electrical cable for the STLD BEACON2A through the watertight connector (cable gland bushing), and tighten the gland nut to make a watertight seal. Attach the wires to the terminal strip as follows:

Connect Cable Wire Color	To Match	Lamp platform Wire Color	Terminal Block Number
10 Gauge Red		16 Gauge Red	1
14 Gauge White/Green		16 Gauge White/Green	2
16 Gauge Brown		16 Gauge Brown	3
16 Gauge Blue		16 Gauge Blue	4
10 Gauge Black		16 Gauge Black	5
14 Gauge White		16 Gauge White	6
14 Gauge Green		16 Gauge Green	7
10 Gauge Red/Black		16 Gauge Red/Black	8
16 Gauge Bare Wire		Beacon Base	

2.5.2 Tower Kit Wiring

Install wiring between the controller and the beacon utilizing strobe cable. **(TWR LIGHTING CANNOT WARRANTY SYSTEMS THAT EMPLOY SPLICING CABLE.)** Refer to drawings HDO-264, and 602, for installation of light kits. Following these minimum guidelines, as well as any local or end user additional requirements, installing light kits will require lifting of the cable by the supplied cable grip or conduit to affix to the tower. Always work safely and adhere to all OSHA Safety Guidelines when lifting wiring or working on the structure or tower itself. It is the installer's responsibility to install the lighting kit in a safe manner. Installers can request from OSHA their requirements 29CFR 1926.21, and 29CFR 1926.105, to ensure compliance to regulations.

NOTE: *On occasion, a set of custom lighting kit drawings may be specifically requested by a customer and installed in this manual. In cases such as this, the drawings will precede the manual if a conflict occurs.*

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All the necessary information for wiring the STLD BEACON2A and sidelights is contained on the tower kit drawing 602. The connections for the STLD BEACON2A and sidelights in the controller are as follows:

- 2.5.2.1 Connect the 10 gauge **RED/BLACK** wire from STLD BEACON2A wiring to TB1-1.
- 2.5.2.2 Connect the 10 gauge **BLACK** wire from STLD BEACON2A wiring to TB1-2.
- 2.5.2.3 Connect the 14 gauge **WHITE** wire from STLD BEACON2A wiring to TB1-3.
- 2.5.2.4 Connect the 16 gauge **BROWN** wire from STLD BEACON2A wiring to TB1-4.
- 2.5.2.5 Connect the 16 gauge **BLUE** wire from STLD BEACON2A wiring to TB1-5.
- 2.5.2.6 Connect the 10 gauge **RED** wire from STLD BEACON2A wiring to Fuse Block marked "B."
- 2.5.2.7 Connect the 14 gauge **WHITE/GREEN** wire from STLD BEACON wiring to TB1-11.
- 2.5.2.8 Connect the 14 gauge **GREEN** wire from STLD BEACON2A ground back panel.
- 2.5.2.9 Connect the **NEUTRAL** wire from sidelight wiring to TB1-12.
- 2.5.2.10 Connect the **RED** wire from the sidelight wiring to Fuse Block marked "S."
- 2.5.2.11 Connect the ground wire (if cable is used) from sidelight wiring to ground screw left of TB1.

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2.6 ALARM WIRING

Individual alarm contacts (Form C) are provided for strobe failures, power failure, and photocell on. It is left up to the customer or installer on how they choose to utilize these contacts with their monitoring equipment. External monitoring equipment is available. Please inquire within the sales staff at the factory for models available and pricing. Alarm configurations are shown on drawings H40-264, and M01-264.

2.6.1 White Strobe Failure (SF)

Connect the customer's alarm common to plug P12, terminal #5. Connect the customer's alarm wire to plug P12, terminal #6, for normally open (or) terminal #4, for normally closed monitoring.

2.6.2 Lights On (LO) – Nighttime

Connect the customer's alarm common to plug P12, terminal #2. Connect the customer's alarm wire to plug P12, terminal #1, for normally open (or) terminal #3, for normally closed monitoring.

2.6.3 Power Failure (PF)

Connect the customer's alarm common to plug P12, terminal #11. Connect the customer's alarm wire to plug P12, terminal #12, for normally open (or) terminal #10, for normally closed monitoring.

2.6.4 LED Red Beacon Burnout (BB)

Connect the customer's alarm common to plug P12, terminal #8. Connect the customer's alarm wire to plug P12, terminal #7, for normally open (or) terminal #9, for normally closed monitoring.

2.6.5 Sidelight Failure (SL)

Connect the customer's alarm common to plug P12, terminal #14. Connect the customer's alarm wire to plug P12, terminal #15, for normally open (or) terminal #13, for normally closed monitoring.

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2.7 ALARM TESTING

To test alarms, follow these procedures using an "ohm" meter between alarm common and alarm points.

2.7.1 White Strobe Failure (SF)

White strobe failure testing can be performed in the daymode operation. Check for status of strobe beacon. Turn "on" switch "S1" on PCB 1, and status should change after an eight (8) second delay. After test, turn switch "S1" to the normal operating position.

2.7.2 Lights On (LO)

When controller turns red light mode "ON," lights on relay energize, indicating red system functional.

2.7.3 Power Failure (PF)

While the controller is in normal operation, shut off power to the controller at the breaker panel. Alarm should be prompt. Reset the breaker to resume normal operation.

2.7.4 LED Red Beacon Burnout (BB)

Controller should be in the nightmode of operation when performing this test. Pull Fuse Block marked "F5" to cause failure. System will then operate in fail mode white strobe. After test, re-engage fuse switch "F5."

2.7.5 Sidelight Failure (SL)

Controller should be in the nightmode of operation. Check status of operation. Pull fuse switch "F4" open. Alarm should occur within five (5) seconds. After test, re-engage fuse switch "F4."

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3.0 THEORY OF OPERATION

3.1 THE POWER SUPPLY

The AC line is sent to transformers T1 through fuse F1, MOVMOD, and relay K1. In order for K1 to energize and complete the circuit to T1, the safety interlock switches (CSS & BSS) must be closed. The BSS (beacon safety switch) is located in the base of the beacon. In order for the system to operate, the beacons and the power supply must be closed and secured. The CSS (cabinet safety switch) is located in the enclosure door of the control cabinet. This switch is a three (3) position switch that can be pulled out or depressed by closing the door to complete the circuit.

Transformer T1 secondary outputs are around 1,100V AC. These outputs are sent to the high voltage rectifier PCB (PCB #2) and converts the 1,100V AC to around +550V DC and -550V DC in daymode operation. This high voltage is then used to charge energy storage capacitor bank C103-C109. Resistor R31 is bypassed through K5 during daymode operation.

When the light level drops below 3 foot candles, the photocell supplies 120V AC to relay K3, and energizes it. The power is switched from the T1 to the red beacon control circuit. That consists of a flasher (M3) and a timing module (M4), which will flash the beacon, and a current sensing module (M2), which detects failures.

In the event of LED beacon failure or flasher failure, the K9 relay (failsafe relay) will remove power from the K3 relay, de-energizing it. The power is then switched back to the strobe control circuit (T1). The photocell continues to supply 120V AC to the controller. This voltage is supplied to the K5 relay, which removes C103-C109 from the discharge path leaving capacitor C102 in the circuit for failsafe mode operation. Transformer T1 secondary outputs are converted from 1,100V AC at the PCB #2 to around +700V DC and -550V DC for failsafe mode operation. This high voltage is then used to charge the energy storage capacitor C102 through the current limiting resistor R31, and the steering diode D5. The energy storage capacitor bank is connected to the flashtube through the interconnecting tower wiring.

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3.2 THE FLASHTUBE

The flashtubes FT1 (daymode) is a quartz tube containing two (2) electrodes. The electrode at the positive (+) end is called the anode and is connected to the positive side of the storage capacitors through inductor L1. The electrode at the negative (-) end of the tube is called the Cathode, and is connected to the negative (-) side of the energy storage capacitors banks.

The flashtube contains a gas called Xenon. When the high voltage energy in the storage capacitors is connected to the flashtube, nothing will happen since Xenon in its natural state is not a conductor of electricity. However, when a very short duration high voltage pulse is impressed on the trigger element of the tube (via the power supply and trigger transformer T4), the Xenon gas is ionized and thereby becomes a good conductor of electricity. This allows the electrical energy in the storage capacitors to discharge rapidly through the flashtube, which converts this energy to light energy and heat energy. When the voltage stored in the capacitors discharges to a low level, the Xenon gas can no longer sustain conduction and since the short trigger pulse is gone by this time, it deionizes returning to its non-conducting state until another trigger pulse arrives to repeat the process. Meanwhile, the storage capacitor is being recharged by the transformer and the high voltage rectifiers.

3.3 LED BEACON

When the photocell turns on at nightfall, that sends 120V AC to Relay K3, and energizes it. The power is switched to red beacon control circuit. That consists of a flasher (M3), a timing module (M4), and a current sensing module (M2). These modules are used to flash the LED Beacon and detect the failures, as well.

3.4 TIMING CIRCUIT

The timing circuit is contained entirely on printed circuit board #1. The timing circuit has its own power supply. This circuit converts the AC voltage to approximately 12V DC, which is used to supply all of the components in this circuit. It uses this low voltage DC to generate pulses that control the flash rate of the flashtube. It actually generates two (2) groups of pulses. The first is a pulse approximately once every 1.5 seconds to operate the flashtube during daylight hours. The second is a burst at 100 Hz to elongate the apparent flash during the nighttime hours at reduced flash energy when it failsafes in nightmode.

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3.5 TRIGGER CIRCUIT

The trigger circuit is supplied by transformer T2 secondary windings. The 250V AC is converted to DC, which is stored in a storage capacitor much like the action of the high voltage circuit. The main difference is that the storage capacitor is much smaller. The trigger circuit receives the pulses generated by the timing circuit. It releases its stored energy with each pulse and delivers it to the flashtube's trigger element to initiate each flash.

3.6 ALARM CIRCUITS

3.6.1 White Strobe Failure (SF)

White Strobe Failure alarm circuit monitors each flash of the daymode flashtube within the beacon. If the flashtube fails to flash (for any reason), the alarm circuit operates relay K11, (on PCB #3) which the customer can connect to their alarm transmitting devices. The alarm point can be accessed on P12 of PCB #3.

3.6.2 LED Red Beacon Burnout (BB)

When LED Red Beacon burns out, or fails to flash, a signal from Module M2 will energize the K8 relay on PCB #3, then K8 will energize K10, for LED Red Beacon Alarm. Alarm point can be accessed on P12, PCB #3.

3.6.3 Power Failure (PF)

The power failure alarm relay is energized during normal operation. If the power is removed for any reason, then relay K6 will drop, creating an alarm for the customer's alarm-transmitting device.

3.6.4 Sidelight Failure (SL)

Module M1 monitors the current flowing to the sidelights. This module can monitor from 1-4 lamps. Factory setting is generally for three (3) lamps. When the current falls below two (2) lamps (one [1] lamp less than the factory setting), then the onboard relay will engage, creating an alarm which is then sent to P12.

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3.7 BLEEDER CIRCUIT

The bleeder circuit is the most important safety item in this system. It consists of resistor R32 connected to the high voltage storage capacitor through relay K2. When the AC line voltage is turned off, the relay will close allowing the resistors to discharge the high voltage stored in the capacitor banks below 50V in 30 seconds.

****CAUTION****

NEVER RELY ON THIS CIRCUIT TO RENDER THIS SYSTEM HARMLESS. ANY DEFECT IN THIS CIRCUIT COULD ALLOW A HAZARDOUS HIGH VOLTAGE CHARGE TO REMAIN ON THE STORAGE CAPACITORS. ALWAYS WAIT AT LEAST 30 SECONDS AFTER POWER HAS BEEN TURNED OFF BEFORE STARTING ANY WORK ON THIS SYSTEM. ALWAYS MEASURE THE VOLTAGE ON THE STORAGE CAPACITORS WITH A VOLTMETER BEFORE STARTING ANY OTHER WORK ON THIS SYSTEM. NEVER ATTEMPT TO DEFEAT THE SAFETY INTERLOCKS.

3.8 DIAGNOSTIC CIRCUITS

The diagnostic circuit is provided as a means of making system checks and maintenance more convenient. This circuit is entirely contained on the printed circuit boards PCB #1 and PCB #2. The circuits that are contained on PCB #1 and PCB #2 are as follows:

3.8.1 Control Power On (PCB #1, LED4)

Line from the 120V AC input is sent through safety switches CSS, BSS, isolation transformer T2, fuse F3, and Relay K1 to PCB #1. Once this low voltage is at PCB #1, it is sent to a step down transformer, then it is rectified, and then sent to LED4 (D15). If for any reason power is interrupted, (STLDBEACON2A opened, controller door open, blown F3 fuse, failed relay, etc.) LED4 would be extinguished.

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3.8.2 High Voltage (PCB #2, LED 1, #D14)

The Cathode side of the high voltage HV is routed through a current limiting resistor. When the unit is in daymode, LED 1, D14 will be at full brightness when the capacitors are at full charge, but dims with the discharging of the storage capacitors. A constant intensity indicates that high voltage is present but capacitors are not discharging (check other indicators for fault). When the red LED fails to glow, then the high voltage is no longer present.

3.8.3 Trigger Voltage (PCB #1, LED6)

The voltage from secondary of T1 is sent to PCB #1, then rectified for trigger circuit. The LED6 is connected to the trigger voltage via R30. Under normal circumstances, the red LED must be flashing synchronously with the strobe. An absence of this indication means that the voltage is no longer present.

3.8.4 Nightmode

Output voltage from the photocell (SSR) energizes K4 on PCB #3. The circuit switches the input power to the red circuit that in turn will operate the LED Red Beacon. If a failure in the LED Red Beacon occurs, the control circuit will switch power back to the white strobe for failsafe as described in the next section.

3.8.4.1 Failsafe Mode (PCB #1, LED7)

Since the power switches back to the strobe circuit, the photocell (SSR) energizes RYL1 on the main PCB #1 that will send 12V to light LED7, and set timing circuit operating in nightmode as well.

3.8.5 Primary Timing (PCB #1, LED8)

The primary timing pulses are received at LED8 (D3). LED8 will flash according to the pulses received from the timing circuit. If LED8 fails to flash, then the primary timing circuit has failed. Check LED9 (D28) for secondary timing operation. The strobe unit should produce 40 (+/-2) pulses per minute.

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3.8.6 Timing Signal Verify (PCB #1, LED9)

Timing pulses (either primary or secondary) are received at LED9 (D28). The LED will flash according to the pulses received from the timing circuit, but should be 40 +/-2 FPM. In the unlikely event that this LED is out, then total timing failure has occurred.

3.8.7 Flash Verified (PCB #1, LED5)

Current from the Cathode side of the flashtube (FTC) is sent through the current sensing transformer T4 on PCB #1. T4 will send a pulse to the gate of the SCR's Q13, and turn it on. Capacitor C15, which is fully charged via Q13, will send voltage to LED5. After each confirmed flash, LED5 will blink. Absence of a blinking LED signifies that the strobe beacon has ceased to flash.

3.8.8 Strobe Fail Test (PBC #1, LED2)

Switch S1, when turned downward, cuts off the timing signal to the trigger circuit and extinguishes LED9 (D28). Then LED2 (D25) flashes to confirm the trigger circuit is disabled. At this time, a strobe alarm should be received at P12. The normal position of switch S1 is on (switch upward).

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DUAL MEDIUM INTENSITY LED/STROBE MODEL E-1DBSL

4.0 TROUBLESHOOTING

Much of the troubleshooting of this system will consist of correcting a "beacon out" situation. There may also be a failure mode where the flashtube is still flashing, but at the wrong rate or the wrong intensity.

You must study and understand the safety messages and the theory of operation before attempting any service on this system. Servicing this system must be done by qualified personnel only.

*****WARNING – HIGH – VOLTAGE*****

THIS SYSTEM OPERATES AT HIGH VOLTAGE LEVELS THAT COULD BE LETHAL TO SERVICE PERSONNEL. ALL INSTALLATION AND MAINTENANCE WORK MUST BE DONE BY QUALIFIED SERVICE PERSONNEL. READ AND UNDERSTAND THE THEORY OF OPERATION AND ITS SAFETY MESSAGES BEFORE ATTEMPTING INSTALLATION OF THIS SYSTEM. DO NOT ATTEMPT TO DEFEAT THE INTERNAL SAFETY DEVICES.

4.1 TOOL REQUIREMENTS

In order to be prepared to troubleshoot or repair this system, a minimum amount of tools and equipment will be required. A recommendation list includes:

- 1) 5/16 Flat Electrician's Screwdriver
- 1) Nut Driver or Socket Set
- 1) VOM with 600V AC / 1,000V DC range and a 40M ohm scale

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4.2 DIAGNOSTIC EVALUATION

The first step in troubleshooting of this system or performing annual maintenance will require the technician to open the controller door. With the power off to the controller, the technician shall look over the controller circuit, and repair or replace any apparent problems, such as loose wire connections, or corroded terminations. After the initial visual checks have been completed, restore power to the controller and pull out on the plunger of the cabinet safety switch (CSS), which is located at the lower right edge of the enclosure. Observe at this time the LEDs located on PCB #1, and PCB #2. Determine, by observation of these LED indicators, if the controller is performing in normal operation.

LEDs on PCB #1 are numbered from top to bottom, 1-9. LEDs on PCB #2 are numbered from top to bottom, D14 - D16. The following chart will indicate normal LED operation.

INDICATOR	OPERATION	NORMAL STATUS
LED 2	Strobe Fail Test	Normal OFF/Flashes in Test Mode
LED5	Flash Verify	Blinks
LED4	Control Power ON	Steady ON
LED6	Trigger Voltage	Steady ON
LED7	Failsafe Mode	Steady ON During Failsafe Mode Operation
LED8	Primary Timing	Flashing
LED9	Timing Verify	Flashing
D14	High Voltage #1	Steady ON when Voltage Above 50V DC

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4.3 TROUBLESHOOTING ASSISTANCE

4.3.1 Strobe Flash Verify LED - Out

- 4.3.1.1 Observe high voltage LED (D14) on the high voltage rectifier PCB #2, to determine if it is available. If the LED is dim or out completely, then check the high voltage capacitor bank (C103 - C109 daymode, C102 nightmode) for a short. If no capacitor is found to be shorted, check the resonant cap (C101) for a short. If the resonant cap is okay, replace PCB #2. If the LED is at full illumination, go to the next step.
- 4.3.1.2 Check the status of trigger LED6. If LED is off, check fuse F2. If blown, replace with exact type of fuse. If the fuse blows again, replace PCB #1. Check transformer T1. Replace as necessary. If LED is okay, go to the next step.
- 4.3.1.3 If steps 4.3.1.1 and 4.3.1.2 check out okay, re-lamp the STLD BEACON2A.

4.3.2 Control Power on LED - Out

Check interlock circuit for an open circuit. If open, make the necessary repairs. If okay, check fuse F3 in the cabinet. Replace if bad.

4.3.3 Primary Timing LED – Out

Observe the status of the timing LED8. If the LED is dim or out completely, check LED9, and if dim or out, replace PCB #1. If one or both are lit, you should have timing.

4.3.4 False or Nonexistent Strobe Alarm (SF)

- 4.3.4.1 If alarm trips when the system appears to be working normally, or fails to show an alarm when there is an obvious failure, replace PCB #1.

DUAL MEDIUM INTENSITY LED/STROBE MODEL E-1DBSL

4.3.4.2 Check relay K11 coil for an open condition. Normal resistance should be around 2K ohm. If coil is open, replace K7.

4.3.4.3 The time delay between an actual failure and the point where the relay trips is pre-set at the factory at about eight (8) seconds. This delay period can be tested by throwing “on” switch S1 (on the PCB #1). When this switch is in the alarm test mode, the flash verified indicator (LED#1) will not be illuminated.

4.3.5. STLD BEACON2A/Flasher Failure

In case a failure occurs in the red beacon portion, either the STLD BEACON2A or flasher failed. The system will operate in the failsafe mode, and have beacon fail alarm at the P12 plug. Pin #8 is common, P#7 is closed, and P#9 is open.

To troubleshoot the red beacon portion:

- 1) turn power off at circuit breaker to reset the light system,
- 2) pull Relay K8 out of socket, and set SW3 to nightmode (upward position),
- 3) then turn power on at circuit breaker. Observe the red STLD BEACON2A.
IF: Beacon steady burns, replace M3 (Flasher)
IF: No light – check F5 fuse. If F5 fuse is good, replace the red LED Beacon.

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DUAL MEDIUM INTENSITY LED/STROBE MODEL E-1DBSL

5.0 MAINTENANCE GUIDE

****WARNING - HIGH - VOLTAGE****

THIS SYSTEM OPERATES AT HIGH VOLTAGE LEVELS THAT COULD BE LETHAL TO SERVICE PERSONNEL. ALL INSTALLATION AND MAINTENANCE WORK MUST BE DONE BY QUALIFIED SERVICE PERSONNEL. READ AND UNDERSTAND THE THEORY OF OPERATION AND ITS SAFETY MESSAGES BEFORE ATTEMPTING INSTALLATION OF THIS SYSTEM. DO NOT ATTEMPT TO DEFEAT THE INTERNAL SAFETY DEVICES.

Tools Required: #2 Phillips Screwdriver
3/16 Flat Blade Screwdriver

5.1 FLASHTUBE REPLACEMENT

The only required maintenance needed to be performed is the replacement of the flashtube every four (4) years. By following these instructions, maximum safety and performance can be achieved.

5.1.1 Loosen the single quick open bolt located on upper hinge assembly.

5.1.2 Open the lens and tilt it back.

**ALWAYS WAIT AT LEAST 30 SECONDS AFTER OPENING THE
STLDBEACON BEFORE STARTING ANY WORK.**

5.1.3 Loosen the three (3) socket screws with a #2 Phillips screwdriver to remove lamp.

5.1.4 Install the new flashtube, making sure that the pins are aligned with the socket. Make sure tube is flush on the socket.

5.1.5 Tighten the socket screws snug, then 1/4 turn more.

5.1.6 Close the lens. Make sure nothing hampers the safety interlock action.

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5.1.7 Re-tighten the single quick open bolt on the STLD BEACON2A hinge.

5.2 RED OBSTRUCTION LIGHTING

The only required maintenance needed to be performed is replacement of the lamps in the L-810 fixture. Lamps should be replaced after being operated for not more than 75% of the rated life or immediately upon failure as per FAA Advisory Circular 70/7460-1K. By following these instructions, maximum safety and performance can be achieved.

Tools Required: None

5.2.1 LED LAMP REPLACEMENT SIDELIGHTS

No maintenance is needed or required, other than replacement as necessary.

5.3 PHOTOCELL

The photocell is a sealed unit. No maintenance is needed or required, other than replacement as necessary.

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DUAL MEDIUM INTENSITY LED/STROBE MODEL E-1DBSL

6.0 MAJOR COMPONENTS LIST

PART NUMBER	DESCRIPTION	SCHEMATIC TAG #
STJ02003	BEACON SAFETY SWITCH	
STB99006	40 uf 1kv CAP	C103 - C109
STB99008CSI	3 uf 660V AC CAP	C101, C102
STJ02001	CABINET SAFETY SWITCH	CSS
FNQ10	10 amp FUSE	F1
FLQ 1/8	1/8 amp FUSE	F2
FUSE .5	.5 amp FUSE	F3
STFLSHTB8	FLASHTUBE	
KRPA11AG120V	DPDT OCTAL RELAY	K5, K1, K7, K9
KRPA5AG120V	SPDT OCTAL RELAY	K4, K6, K8, K10, K12
SPEC 218	5 SECOND TIME DELAY ON RELEASE RELAY	K11
STJ10016	BLEEDER RELAY	K2
INDCTR3001	INDUCTOR	
100273	BURSTING CHOKE	L11
MOV524V15	METAL OXIDE VARISTOR	MOV2
V1000LA80A	METAL OXIDE VARISTOR	MOV3
STT60021	15 POSITION PLUG	P1
STH01226B	CONTROL PCB	PCB #1
PRD5AYO	DAY/NIGHT RELAY	K3
STH02226A	HIGH VOLTAGE RECTIFIER PCB	PCB #2

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DUAL MEDIUM INTENSITY LED/STROBE MODEL E-1DBSL

6.0 MAJOR COMPONENTS LIST (continued)

PART NUMBER	DESCRIPTION	SCHEMATIC TAG #
SPM-120 (This replaces the DTK-120HW)	SURGE ARRESTOR 120V AC	MOV1
STH03264A	RELAY PCB w/ALARM LOCKOUT ELIMINATION MODIFICATION	PCB #3
6390 – FAA2 (This replaces the P2455L Photocell)	120 - 240V PHOTOCELL	PHOTOCELL
KTK1	1 amp FUSE	F4
KTK2	2 amp FUSE	F5
PF-250 (This replaces the FS15530T Flasher)	FLASHER SOLID STATE	M3
TS14130	TIMER	M4
STA08018	150 ohm 100W	R31
STA08015	35k 20W	R32
STA08010	2.4 meg 2W	R33
STJ01004	SPDT 15 amp SWITCH	SW3
STC05004	ISOLATION TRANSFORMER	T2
STC30018	FERRORESONANT TRANSFORMER	T1
TERMBLK-12	12 PART TERM BLK	TB1
TERMBLK 141 – 12	12 PART TERM BLK	TB2
STJ10008	THERMAL LIMITING SWITCH	TLS
STLDBEACON2A	STROBE LED BEACON	

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DUAL MEDIUM INTENSITY LED/STROBE MODEL E-1DBSL

6.0 MAJOR COMPONENTS LIST (continued)

PART NUMBER	DESCRIPTION	SCHEMATIC TAG #
STDBCLENS	CLEAR DUAL BEACON LENS	
STBEAGSK2	BEACON GASKET	
RM22JA31MRSP01	CURRENT SENSOR	M1, M2
STC05005	TRIGGER TRANSFORMER	
STA22011	AUXILIARY LOAD RESISTOR	R34
DBTERMBLK8KIT	DUAL BEACON UPPER TERMINAL BLOCK KIT	
DBTERMBLK10KIT	DUAL BEACON LOWER TERMINAL BLOCK KIT	
STROBCABLE-3	STROBE BEACON CABLE	
STCABLEOB	SIDELIGHT CABLE	
STLDBCTUBE-2	STLDBEAON2A, BOTTOM CLEAR LENS	
STCABLTIE	STROBE CABLE TIE	
STLDHATPLT	STLDBEAON2A HATCH LATCH ASSEMBLY	
CABLEGRIP1	SINGLE EYE LACE MESH .50 - .62	
CABLEGRIP3	SINGLE EYE LACE MESH .63 - .74	
LED120-2RK	LED SIDELIGHT 120-240V AC RETROFIT KIT ASSEMBLY	

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7.0 SUGGESTED PARTS LIST

QTY	PART NUMBER	DESCRIPTION
1	STH01226B	PCB #1 PRINTED CIRCUIT BOARD
1	STJ10016	BLEEDER RELAY
1	STFLSHTB8	STROBE FLASHTUBE
1	6390 – FAA2 (This replaces the P2455L Photocell)	120 – 240V PHOTOCELL
2	FNQ10	10 amp FUSE
2	FLQ18	1/8 amp FUSE
2	FUSE .5	½ amp FUSE
1	KRPA5AG120	SPDT RELAY
2	KRPA11AG120	DPDT RELAY
1	PRD5AYO (K3)	SPDT RELAY
1	PF-250 (This replaces the FS15530T Flasher)	FLASHER (M3)
1	TS14130	TIMER (M4)
2	KTK2	2 amp FUSE
2	KTK1	1 amp FUSE
1	100273	BURST CHOKE
1	RM22JA31MRSP01	CURRENT SENSORS (M1 and M2)

TWR Lighting, Inc. **HARK**[®]

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DUAL MEDIUM INTENSITY LED/STROBE MODEL E-1DBSL

Warranty & Return Policy

TWR Lighting[®], Inc. (“TWR[®]”) warrants its products (other than “LED Product”) against defects in design, material (excluding incandescent bulbs) and workmanship for a period ending on the earlier of two (2) years from the date of shipment or one (1) year from the date of installation.

TWR Lighting[®], Inc. (“TWR[®]”) warrants its “LED Product” against defects in design, material and workmanship for a period of five (5) years from the date of shipment. TWR[®], at its sole option, will, itself, or through others, repair, replace or refund the purchase price paid for “LED Product” that TWR[®] verifies as being inoperable due to original design, material, or workmanship. All warranty replacement “LED Product” is warranted only for the remainder of the original warranty of the “LED Product” replaced. Replacement “LED Product” will be equivalent in function, but not necessarily identical, to the replaced “LED Product.”

TWR Lighting[®], Inc. (“TWR[®]”) warrants its “LED Product” against light degradation for a period of five (5) years from the date of installation. TWR[®], at its sole option, will, itself, or through others, repair, replace, or refund the purchase price paid for “LED Product” that TWR[®] verifies as failing to meet 75% of the minimum intensity requirements as defined in the FAA Advisory Circular 150/5345-43G dated 09/26/12. All warranty replacement “LED Product” is warranted only for the remainder of the original warranty of the “LED Product” replaced. Replacement “LED Product” will be equivalent in function, but not necessarily identical, to the replaced “LED Product.”

Replacement parts (other than “LED Product”) are warranted for 90 days from the date of shipment.

Conditions not covered by this Warranty, or which might **void** this Warranty are as follows:

- x Improper Installation or Operation
- x Misuse
- x Abuse
- x Unauthorized or Improper Repair or Alteration
- x Accident or Negligence in Use, Storage, Transportation, or Handling
- x Any Acts of God or Nature
- x **Non-OEM Parts**

The use of Non-OEM parts or modifications to original equipment design will void the manufacturer warranty and could invalidate the assurance of complying with FAA requirements as published in Advisory Circular 150/5345-43.

TWR Lighting, Inc. HARK®

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DUAL MEDIUM INTENSITY LED/STROBE MODEL E-1DBSL

Warranty & Return Policy (continued)

Field Service – Labor, Travel, and Tower Climb are not covered under warranty. Customer shall be obligated to pay for all incurred charges. An extensive network of certified and insured Service Representatives is available if requested.

Repair, Replacement or Product Return RMA Terms – You must first contact our Customer Service Department at **713-973-6905** to acquire a Return Merchandise Authorization (RMA) number in order to return the product(s). Please have the following information available when requesting an RMA number:

- x The contact name and phone number of the tower owner or
- x The contact name and phone number of the contractor
- x The site name and number
- x The part number(s)
- x The serial number(s) (if any)
- x A description of the problem
- x The billing information
- x The Ship To address

This RMA number must be clearly visible on the outside of the box. If the RMA number is not clearly labeled on the outside of the box, your shipment will be refused. Please ensure the material you are returning is packaged carefully. **The warranty is null and void if the product(s) are damaged in the return shipment.**

All RMAs must be received by TWR LIGHTING®, INC., 10810 W. LITTLE YORK RD. #130, HOUSTON, TX 77041-4051, within 30 days of issuance.

Upon full compliance with the Return Terms, TWR® will replace, repair and return, or credit product(s) returned by the customer. It is TWR®'s sole discretion to determine the disposition of the returned item(s).

TWR Lighting, Inc. HARK[®]

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DUAL MEDIUM INTENSITY LED/STROBE MODEL E-1DBSL

Warranty & Return Policy (continued)

RMA Replacements – Replacement part(s) will be shipped and billed to the customer for product(s) considered as Warranty, pending return of defective product(s). When available, a certified reconditioned part is shipped as warranty replacement with a Return Merchandise Authorization (RMA) number attached. Upon receipt of returned product(s), inspection, testing, and evaluation will be performed to determine the cause of defect. The customer is then notified of the determination of the testing.

- x Product(s) that is deemed defective and/or unrepairable and covered under warranty - a credit will be issued to the customer's account.
- x Product(s) found to have no defect will be subject to a **\$75.00 per hour testing charge (1 hour minimum), which will be invoiced to the customer.** At this time the customer may decide to have the tested part(s) returned and is responsible for the return charges.
- x Product(s) under warranty, which the customer does not wish returned, the customer will be issued a credit against the replacement invoice.

RMA Repair & Return – A Return Merchandise Authorization (RMA) will be issued for all part(s) returned to TWR[®] for repair. Upon receipt of returned product(s), inspection, testing, and evaluation will be performed to determine the cause of defect. The customer is then notified of the determination of the testing. If the returned part(s) is deemed unrepairable, or the returned part(s) is found to have no defect, the customer will be subject to a **\$75.00 per hour testing charge (1 hour minimum), which will be invoiced to the customer.** Should the returned parts be determined to be repairable, a written estimated cost of repair will be sent to the customer for their written approval prior to any work being performed. In order to have the tested part(s) repaired and/or returned, the customer must issue a purchase order and is responsible for the return shipping charges.

RMA Return to Stock – Any product order that is returned to TWR[®] for part(s) ordered incorrectly or found to be unneeded upon receipt by the customer, the customer may be required to pay a minimum **20% restocking fee.** Product returned for credit must be returned within 60-days of original purchase, be in new and resalable condition, and in original packaging. Once the product is received by TWR it's condition will be evaluated and a credit will be issued only once it is determined that the RMA Return Terms have been met.

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DUAL MEDIUM INTENSITY LED/STROBE MODEL E-1DBSL

Warranty & Return Policy (continued)

Credits – Credits are issued once it is determined that all of the Warranty and Return Terms are met. All credits are processed on Fridays. In the event a Friday falls on a Holiday, the credit will be issued on the following Friday.

Freight – All warranty replacement part(s) will be shipped via ground delivery and paid for by TWR®. Delivery other than ground is the responsibility of the customer.

REMEDIES UNDER THIS WARRANTY ARE LIMITED TO PROVISIONS OF REPLACEMENT PARTS AND REPAIRS AS SPECIFICALLY PROVIDED. IN NO EVENT SHALL TWR® BE LIABLE FOR ANY OTHER LOSSES, DAMAGES, COSTS, OR EXPENSES INCURRED BY THE CUSTOMER, INCLUDING, BUT NOT LIMITED TO, LOSS FROM FAILURE OF THE PRODUCT(S) TO OPERATE FOR ANY TIME, AND ALL OTHER DIRECT, INDIRECT, SPECIAL, INCIDENTAL, OR CONSEQUENTIAL DAMAGES, INCLUDING ALL PERSONAL INJURY OR PROPERTY DAMAGE DUE TO ALLEGED NEGLIGENCE, OR ANY OTHER LEGAL THEORY WHATSOEVER. THIS WARRANTY IS MADE BY TWR® EXPRESSLY IN LIEU OF ALL OTHER WARRANTIES, WHETHER EXPRESSED OR IMPLIED. WITHOUT LIMITING THE GENERALITY OF THE FORGOING, TWR® MAKES NO WARRANTY OF MERCHANTABILITY OR FITNESS OF THE PRODUCT(S) FOR ANY PARTICULAR PURPOSE. TWR® EXPRESSLY DISCLAIMS ALL OTHER WARRANTIES.

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**DUAL MEDIUM INTENSITY LED/STROBE
MODEL E-1DBSL**

RETURN MERCHANDISE AUTHORIZATION (RMA) FORM

RMA#: _____ **DATE:** _____

CUSTOMER: _____

CONTACT: _____ **PHONE NO.:** _____

ITEM DESCRIPTION (PART NO.): _____

MODEL NO.: _____ **SERIAL NO.:** _____

ORIGINAL TWR INVOICE NO.: _____ **DATED:** _____

DESCRIPTION OF PROBLEM: _____

SIGNED: _____ **DATE NEEDED:** _____

RETURN ADDRESS: _____

PLEASE RETURN PRODUCT TO: 10810 W. LITTLE YORK RD. #130 HOUSTON, TX 77041-4051

TWR Lighting, Inc. HARK[®]

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DUAL MEDIUM INTENSITY LED/STROBE
MODEL E-1DBSL

RETURN MERCHANDISE AUTHORIZATION (RMA) FORM

RMA#: _____ DATE: _____

CUSTOMER: _____

CONTACT: _____ PHONE NO.: _____

ITEM DESCRIPTION (PART NO.): _____

MODEL NO.: _____ SERIAL NO.: _____

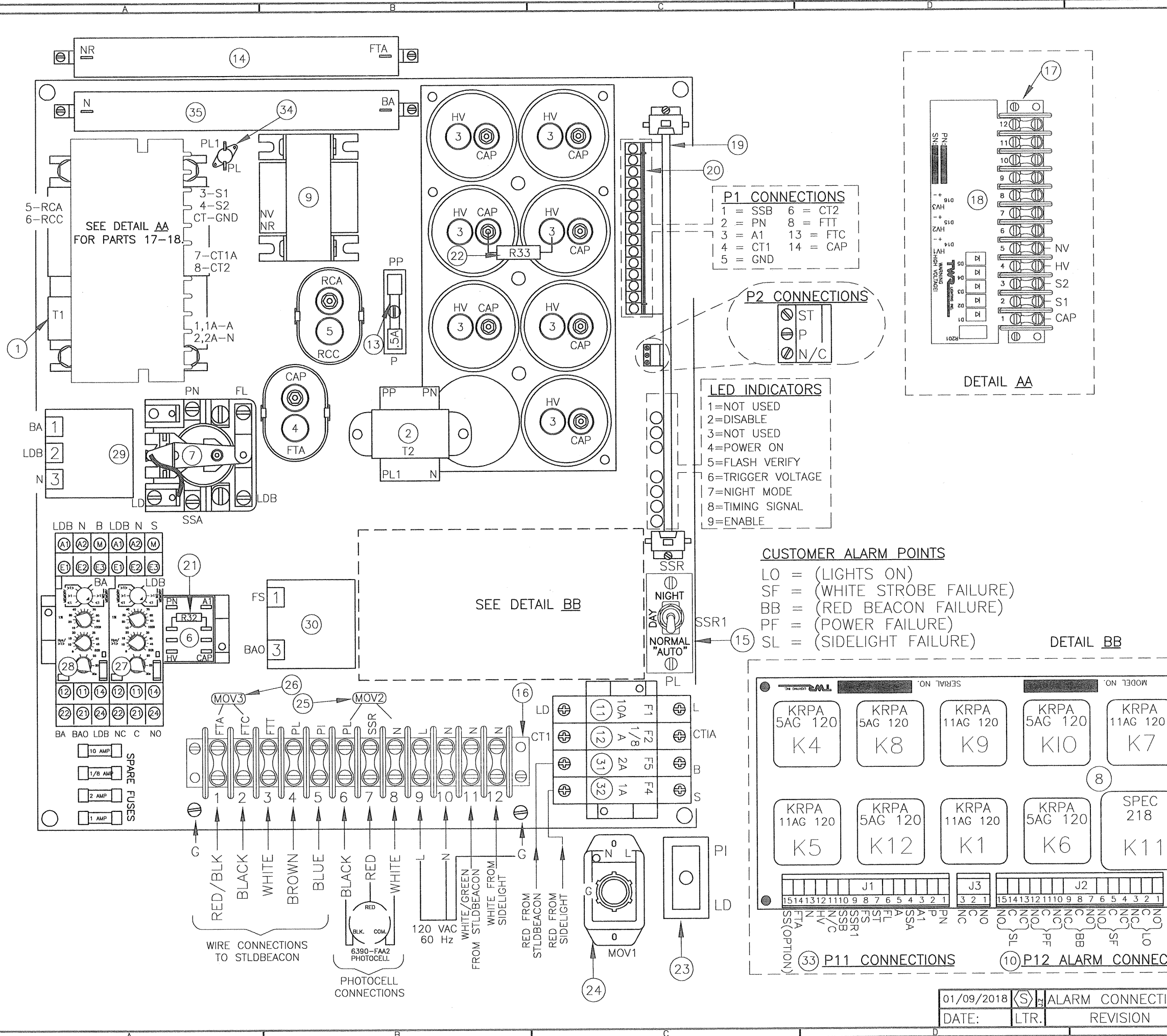
ORIGINAL TWR INVOICE NO.: _____ DATED: _____

DESCRIPTION OF PROBLEM: _____

SIGNED: _____ DATE NEEDED: _____

RETURN ADDRESS: _____

PLEASE RETURN PRODUCT TO: 10810 W. LITTLE YORK RD. #130 HOUSTON, TX 77041-4051



ITEM NO.	SCH. TAG NO.	DESCRIPTION
1	T1	FERRORESONANT TRANSFORMER
2	T2	ISOLATION TRANSFORMER
3	C103-C109	DAY CAPACITORS
4	C102	NIGHT CAPACITOR
5	C101	RESONANT CAPACITOR
6	K2	BLEEDER RELAY
7	K3	REDLIGHT/STROBE POWER RELAY
8	PCB3	RELAY PCB DWG# H03-264A
9	L11	BURST CHOKE
10	P12	CUSTOMER ALARM POINTS
11	F1	10A FUSE (FNQ 10)
12	F2	1/8 AMP FUSE (FNQ 18)
13	F3	.5 AMP FUSE GLASS TYPE
14	R31	150 OHM 100W RESISTOR
15	SW3	PHOTOCELL BYPASS SWITCH
16	TB1	TERMINAL BLOCK 1
17	TB2	TERMINAL BLOCK 2
18	PCB2	HIGH VOLTAGE RECTIFIER PCB DWG# H02-226A
19	PCB1	CONTROL PCB DWG# H01-226B
20	P1	PLUG 1
21	R32	BLEEDER RESISTOR 35K
22	R33	AUXILIARY BLEEDER RESISTOR 2.4M
23	CSS	CABINET SAFETY SWITCH
24	MOV1	LINE MOV
25	MOV2	PHOTOCELL MOV
26	MOV3	HIGH VOLTAGE OUTPUT MOV
27	M1	SIDELIGHT CURRENT SENSOR
28	M2	BEACON CURRENT SENSOR
29	M3	FLASHER
30	M4	TIMER
31	F5	2 AMP FUSE (KTK2)
32	F4	1 AMP FUSE (KTK1)
33	P11	PLUG 2
34	TLS	THERMAL LIMITING SWITCH
35	R34	AUXILIARY LOAD RESISTOR 250Ω

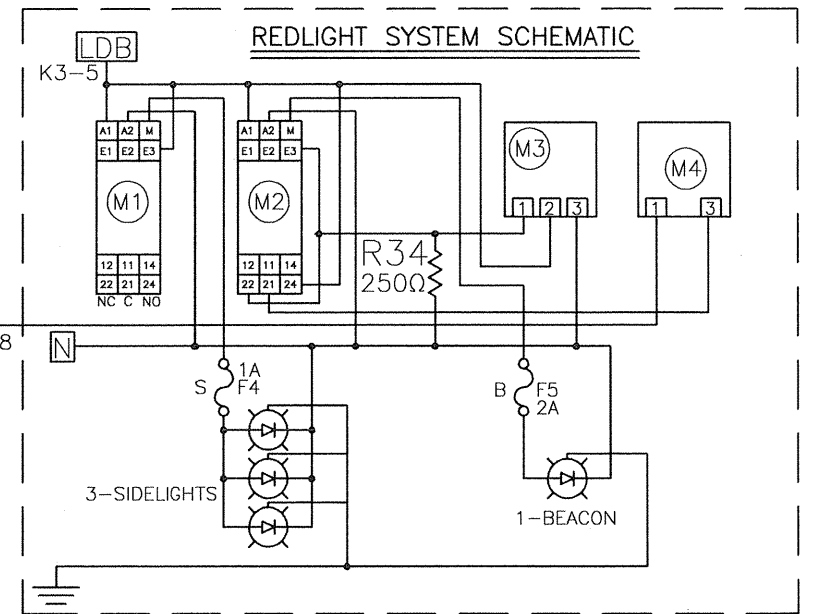
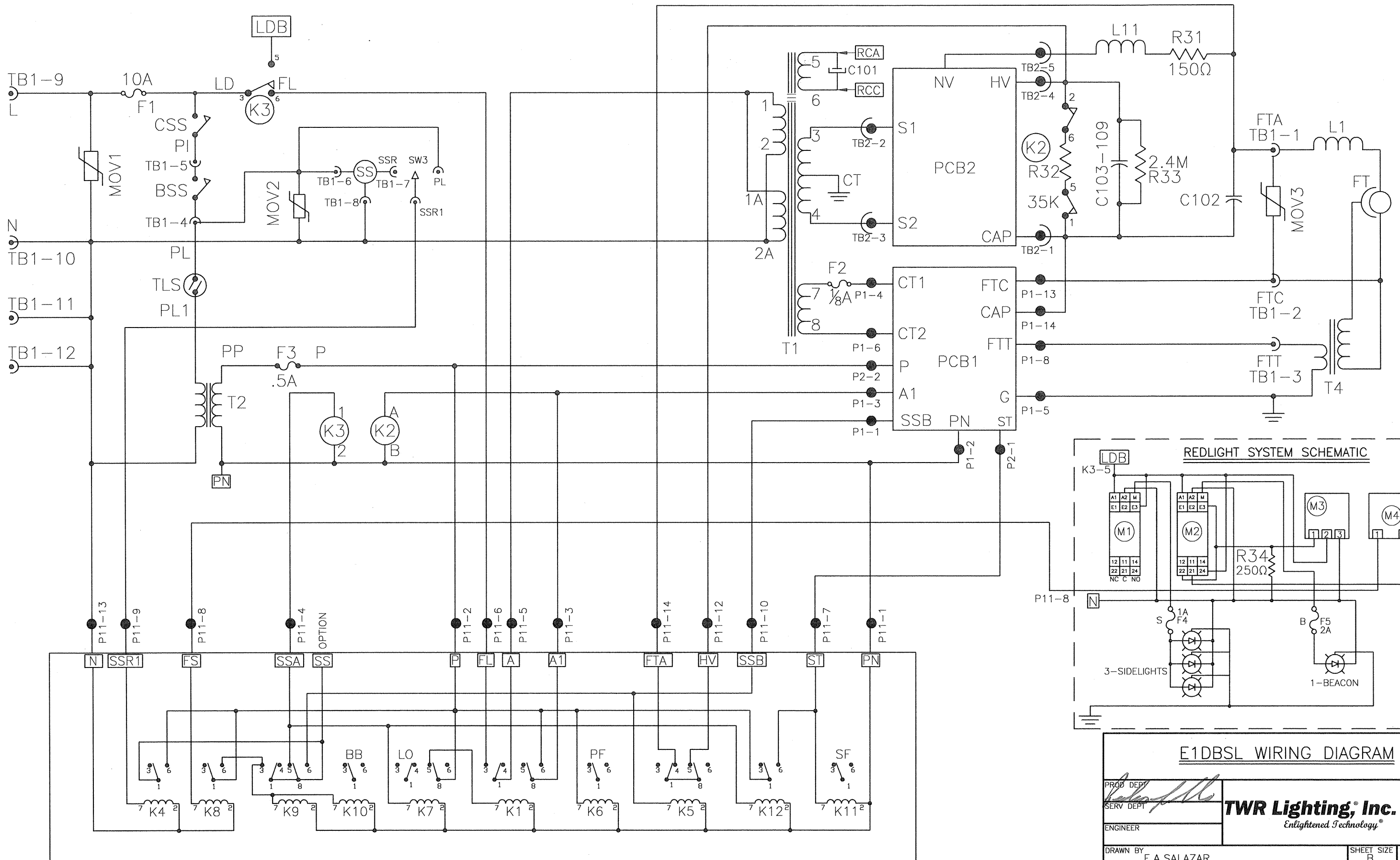
NOTES:
 1. USE BUSSMANN KTK FUSES. SIZE AS SHOWN ON FUSE BLOCKS.
 2. WIRES ARE CONNECTED LETTER TO LETTER. (EXAMPLE: N TO N TO N)
 3. THIS DRAWING IS PROVIDED AS A GENERAL REFERENCE. TWR LIGHTING, INC. DOCUMENTATION SUPERSEDES THIS DRAWING AND SHOULD BE REVIEWED PRIOR TO INSTALLATION OF THIS SYSTEM.

E1DBSL CHASSIS LAYOUT

PROD DEPT	TWR Lighting, Inc. Enlightened Technology		
SERV. DEPT			
ENGINEER	HARK		
DRAWN BY	E.A.SALAZAR	SHEET SIZE	SHEET QTY.
DATE	11/01/03	B	1 OF 1
SCALE	N.T.S.	DWG. NO.	H40-264

The use of non-OEM parts or modifications to original equipment design will void the manufacturer warranty and could invalidate the assurance of complying with FAA requirements as published in Advisory Circular 150/5345-43.
 NOTICE: The drawings and photographic images contained herein are the sole property of TWR Lighting, Inc. All information contained herein that is not generally known shall be considered confidential except to the extent the information has been previously established. The drawings and photographic images contained herein may not be reproduced, copied or used as the basis for manufacture or sale or promotion of any other purpose without the expressed written permission of TWR Lighting, Inc.

01/09/2018	(S)	ALARM CONNECTIONS
DATE:	LTR.	REVISION



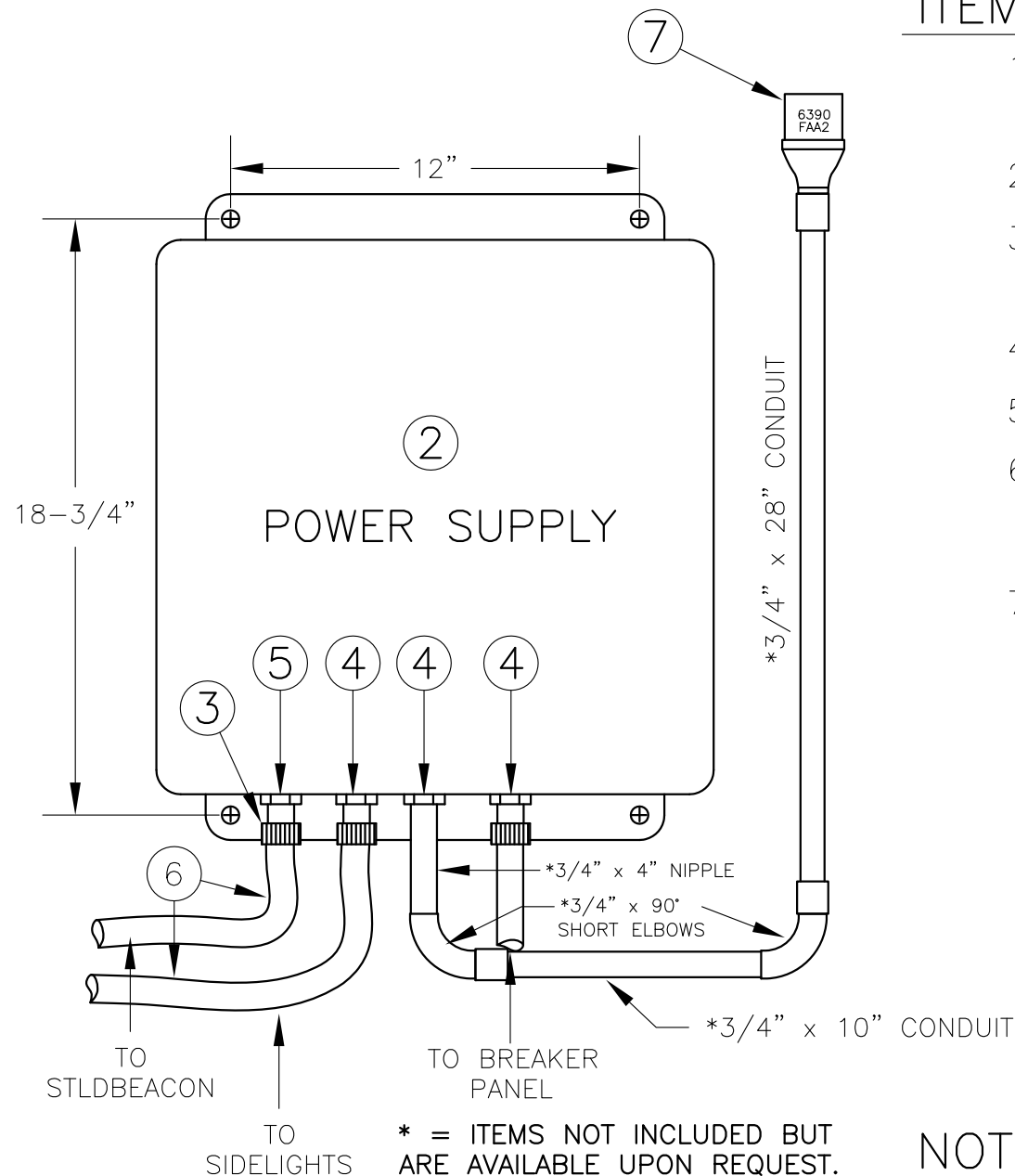
E1DBSL WIRING DIAGRAM

PROB DEPT	TWR Lighting, Inc. <i>Enlightened Technology</i> WARK	SHEET SIZE	SHEET QTY.
SERV DEPT		B	1 OF 1
ENGINEER			
DRAWN BY	E.A. SALAZAR	DATE	11/01/03
SCALE	N.T.S.	DWG. NO.	M01-264

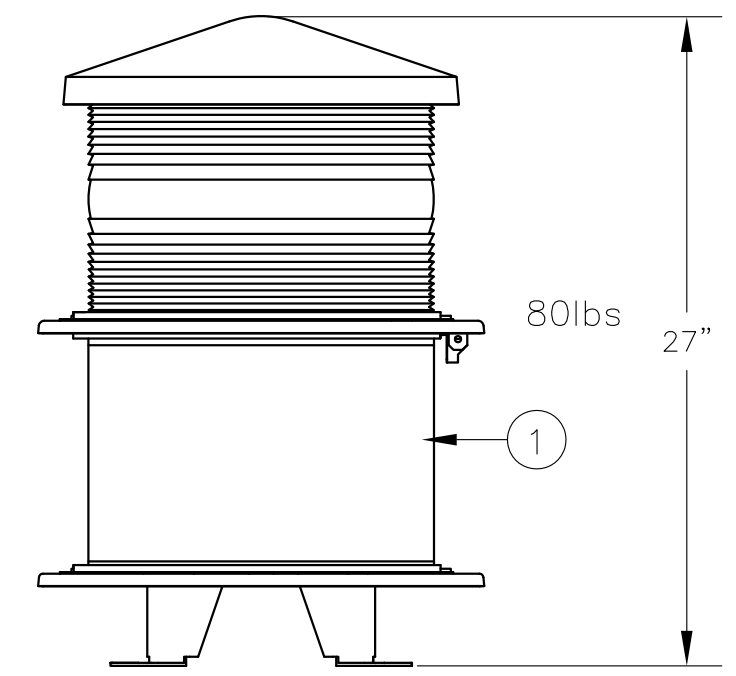
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01/23/2017	(K)	ALARM CONNECTIONS
DATE:	LTR.	REVISION

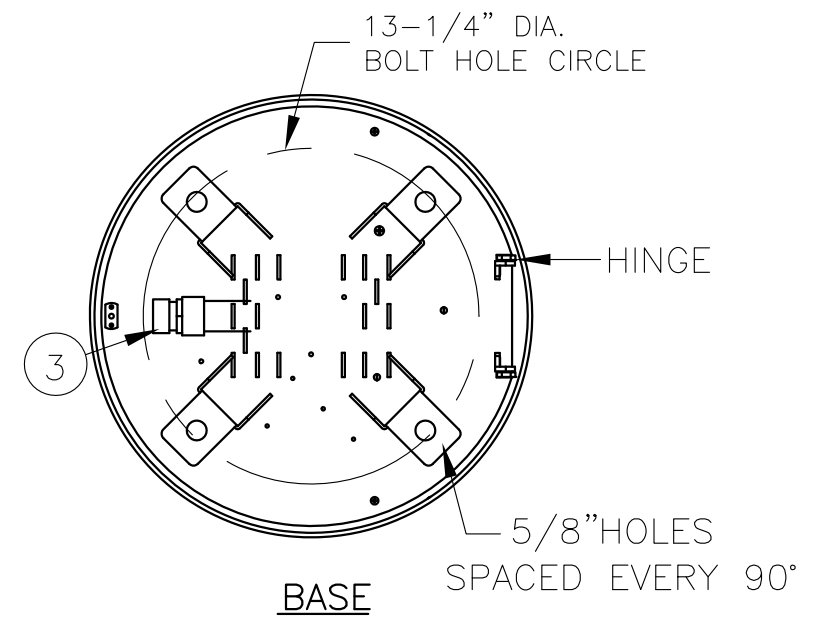
PCB3



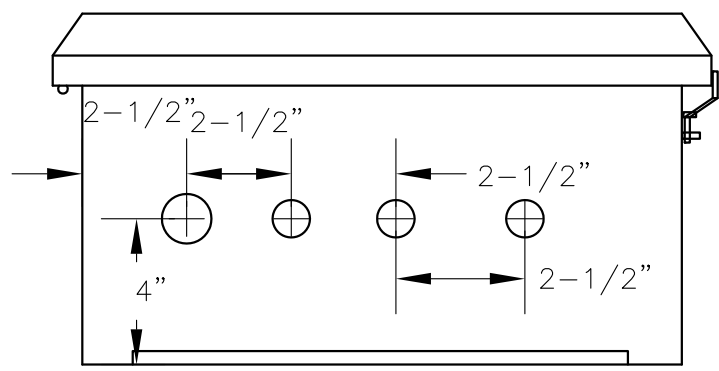
ITEM #	DESCRIPTION
1	BEACON L-864/L-865 WHITE MEDIUM INTENSITY LED/STROBE
2	POWER SUPPLY E1DBSL
3	WATER TIGHT CABLE CONNECTOR WITH SEALING GLAND.
4	MEYERS HUB 3/4"
5	MEYERS HUB 1"
6	STROBE CABLE (REFER TO DRAWING 602 FOR PROPER INSTALLATION).
7	#6390-FAA2 PHOTOCELL



SIDE VIEW



BASE

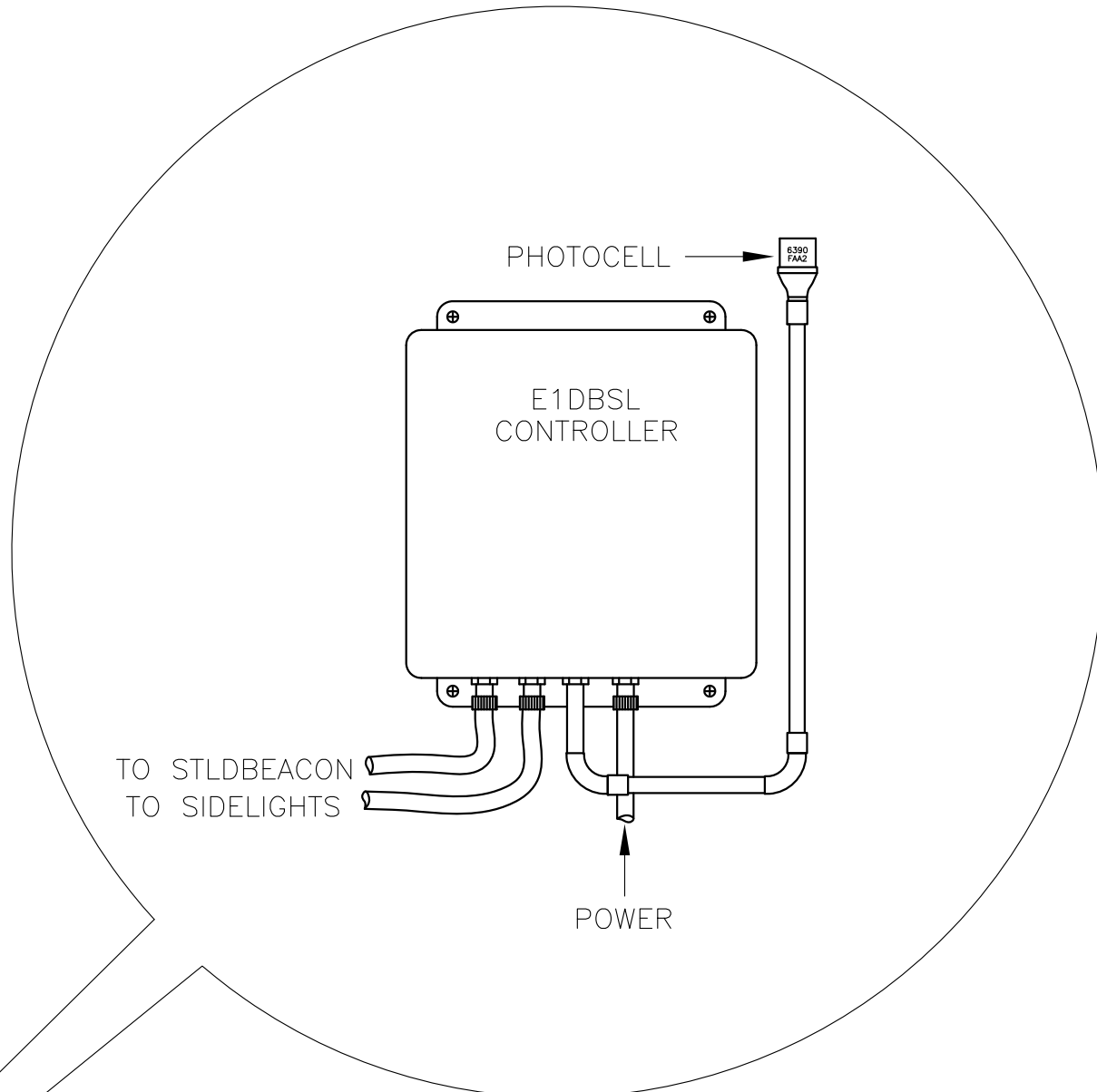
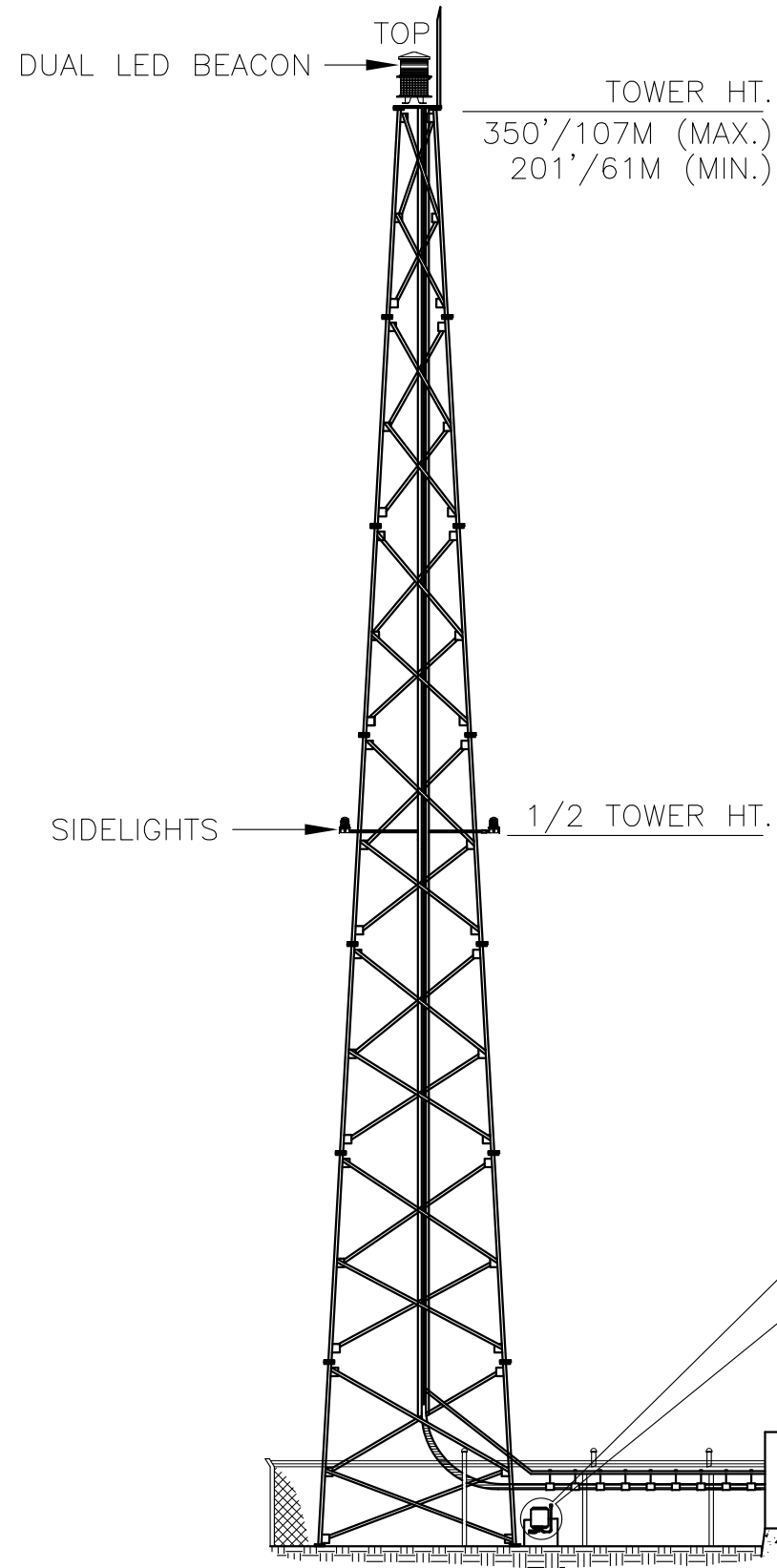


NOTES:

- A POWER SUPPLY IS NORMALLY MOUNTED AT GROUND LEVEL ON TOWER. IT CAN ALSO BE MOUNTED INDOORS. RECOMMENDED MOUNTING HEIGHT IS 48" TO BOTTOM OF THE ENCLOSURE FOR EASE OF MAINTENANCE.
- B MOUNT BEACON HINGES SO LENS WILL OPEN UNOBSTRUCTED BY STRUCTURE.
- C POWER SUPPLY DETAIL FOR L-864/L-865 MODEL NO. E1DBSL LIGHTING CONTROLLER.

HOUSING DETAILS E1DBSL			
L-864/L-865 MEDIUM INTENSITY STROBE			
PROD DEPT	TWR Lighting, Inc. <i>Enlightened Technology®</i>		
SERV DEPT			
ENGINEER			
DRAWN BY	E.A.SALAZAR	SHEET SIZE	SHEET QTY.
DATE	11/02/03	SCALE	N.T.S.
		DWG. NO.	HDO-264
<small>The use of non-OEM parts or modifications to original equipment design will void the manufacturer warranty and could invalidate the assurance of complying with FAA requirements as published in Advisory Circular 150/5345-43.</small>			
<small>NOTICE: The drawings and photographic images contained herein are the sole property of TWR Lighting, Inc. All information contained herein that is not generally known shall be considered confidential except to the extent the information has been previously established. The drawings and photographic images contained herein may not be reproduced, copied or used as the basis for manufacture or sale or promotion or any other purpose without the expressed written permission of TWR Lighting, Inc.</small>			

11/12/2014	(D)	UPDATED BEACON
DATE:	LTR.	REVISION



NOTES:

1. THIS CONTROLLER CAN BE MOUNTED INDOOR OR OUTDOOR.
2. IT IS HIGHLY RECOMMENDED TO MOUNT A LIGHTING ROD AT THE TOP LEVEL.
3. FOR MORE DETAILS REFER TO DRAWINGS HD0-264 (CONTROLLER INSTALLATION), 602 (LIGHT KIT CABLE RUN).

E1DBSL INSTALLATION GUIDELINE

PROD DEPT	TWR Lighting, Inc. <i>Enlightened Technology®</i>	SHEET SIZE	SHEET QTY.
SERV DEPT		B	1 OF 1
ENGINEER			
DRAWN BY	E.A.SALAZAR	SCALE	N.T.S.
DATE	10/20/03	DWG. NO.	INS-264

05/21/08	(A)	CHG. PHOTOCELL
DATE:	LTR.	REVISION

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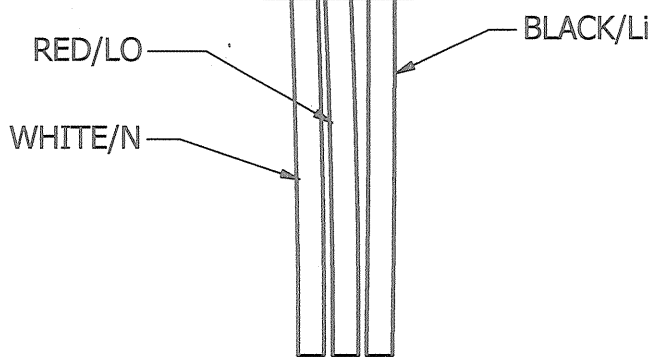
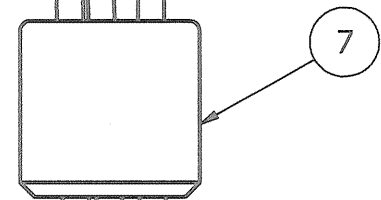
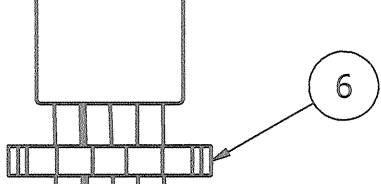
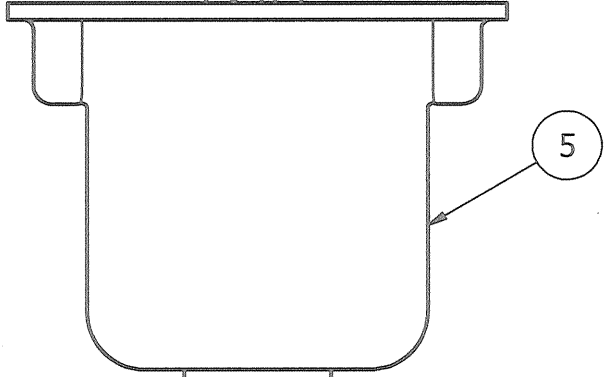
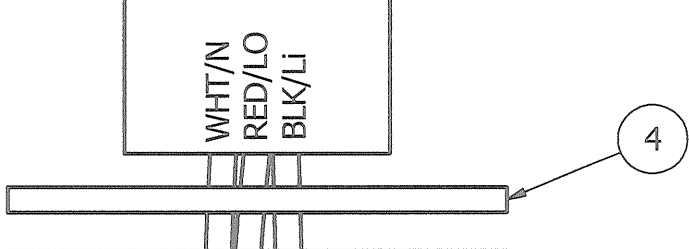
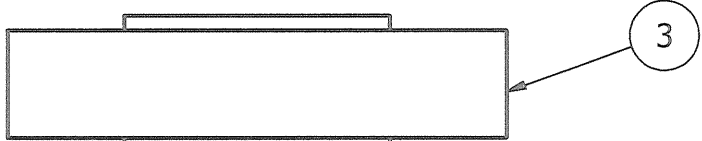
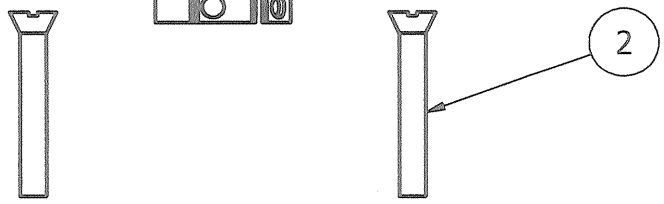
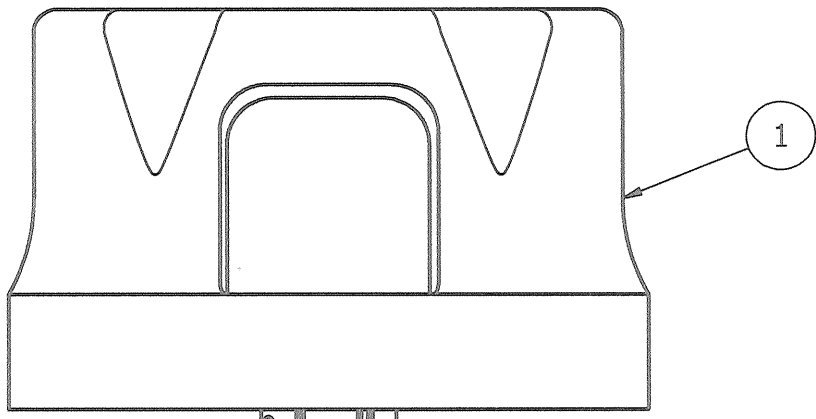
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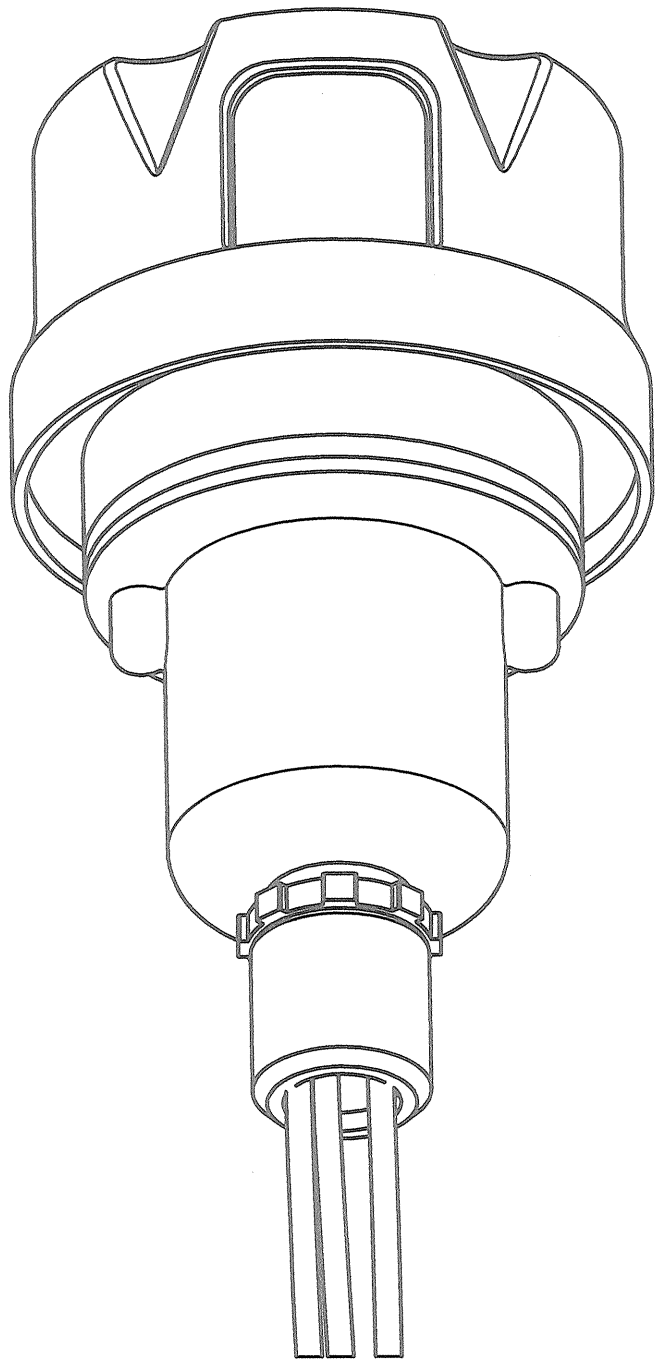
2

1

PARTS LIST		
ITEM	QTY	PART NUMBER
1	1	PHOTOCELL
2	2	6-32 x 1" SCREW
3	1	RECEPTACLE SOCKET
4	1	RECEPTACLE GASKET
5	1	RECEPTACLE HOUSING
6	1	1/2" CONDUIT LOCKNUT
7	1	3/4" TO 1/2" REDUCER



EXPLODED VIEW



ASSEMBLY

NOTES:

- 1. ITEM #7 CAN BE USED TO REDUCE 3/4" CONDUIT TO 1/2" CONDUIT AT THE HOUSING OR AT THE CONTROLLER ITSELF.
- 2. IF ADDITIONAL WIRE IS REQUIRED OVER THE FACTORY 20', USE THE FOLLOWING CHART.
 21' TO 300' - 16 AWG TFFN
 301' TO 500' - 14 AWG TFFN

PHOTOCELL HOUSING DETAIL

PROD. DEPT
 SERV. DEPT
 ENGINEER
TWR Lighting, Inc. HARK
Enlightened Technology®

DRAWN BY	vhernandez	SHEET SIZE	B	SHEET QTY.	1 OF 1
DATE	10/18/1995	SCALE	1/1	DWG. NO.	100239i

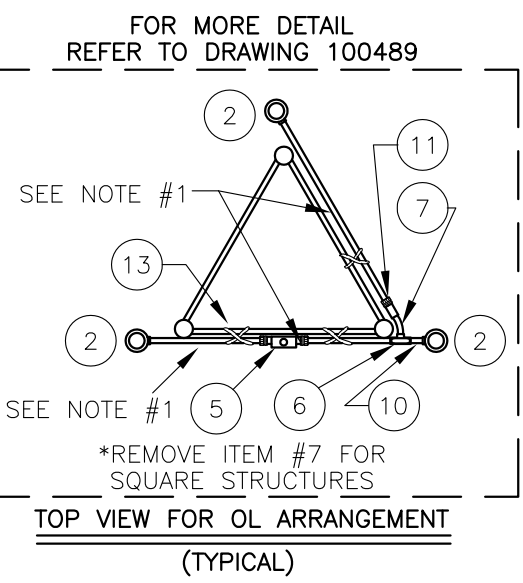
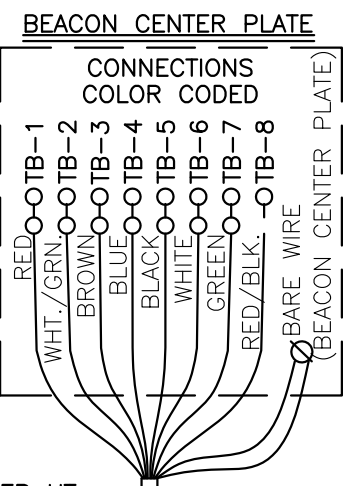
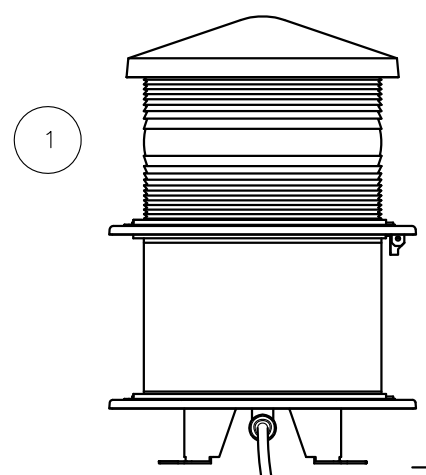
DATE	REV	AUTHOR	DESCRIPTION
02/03/2015	H	JZAMORANO	UPDATED NOTES

4

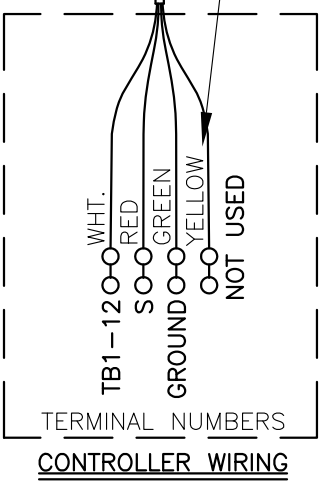
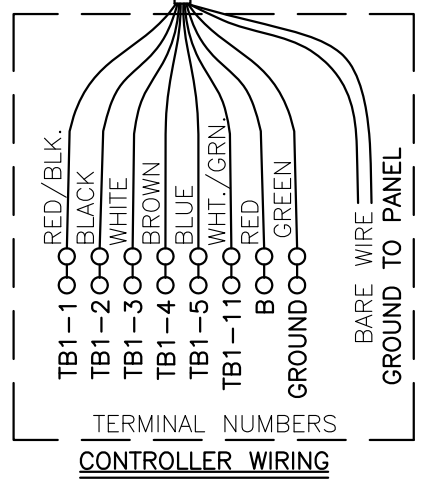
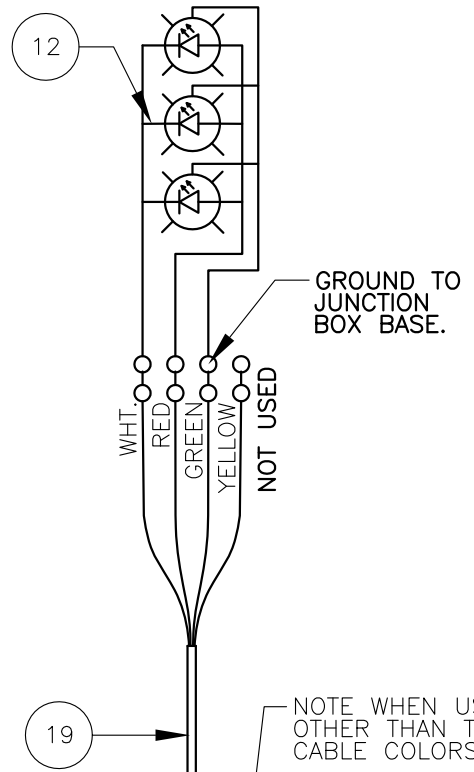
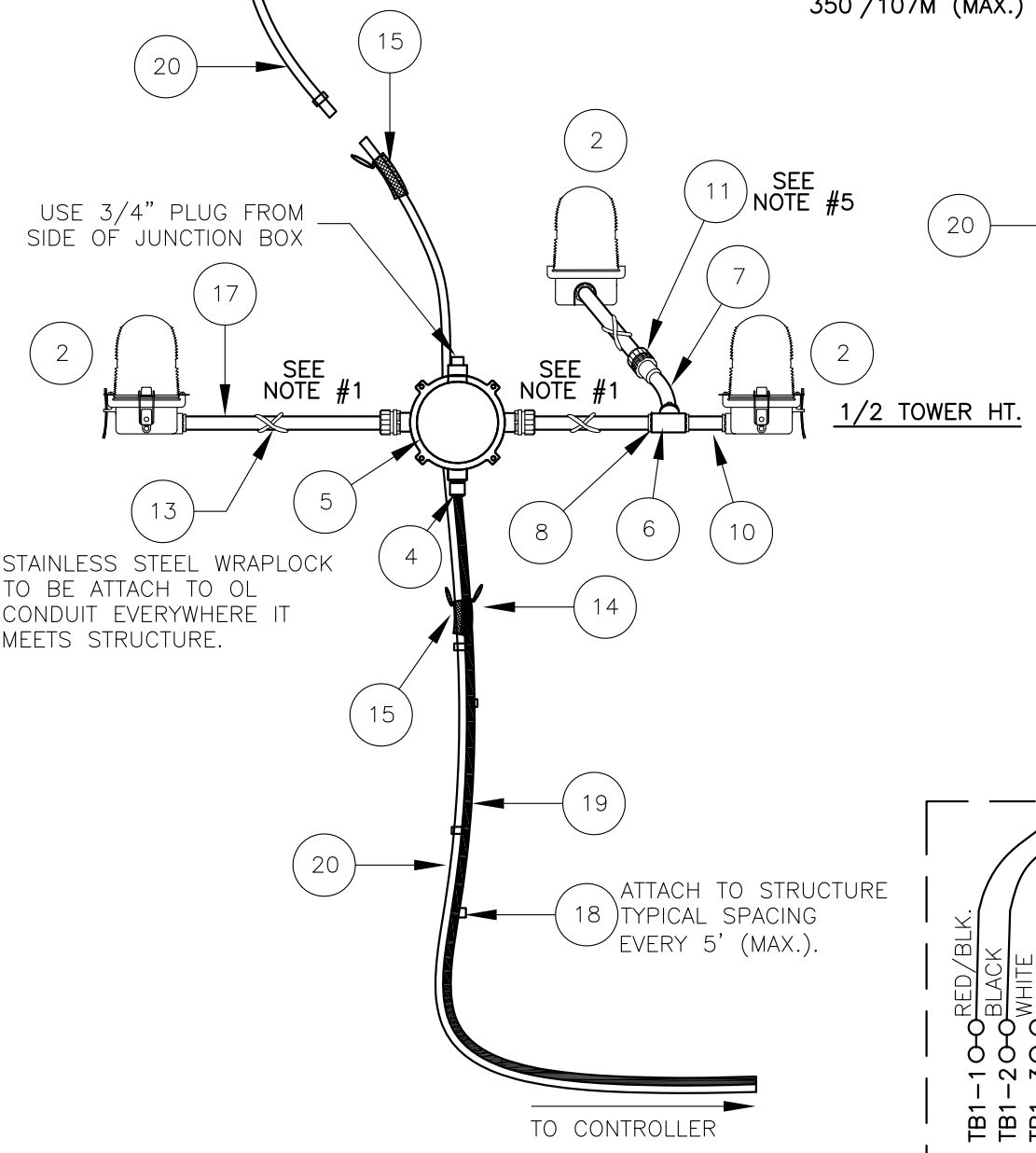
3

2

1



TOWER HT.
201'/61M (MIN.)
350'/107M (MAX.)



BILL OF MATERIALS

ITEM NO.	QTY.	TWR PART NO.	DESCRIPTION
1	1	STLDBEAON2A	DUAL STROBE/LED BEACON
2	3	OL1LED	LED SIDELIGHT 3/4"
3	--	--	--
4	1	CGB295SA	3/4" CORD CONNECTOR 0.50 - 0.625
5	1	JB5	3/4" JUNCTION BOX
6	1	T27CG	3/4" CONDULET W/COVER AND GASKET
7	1	EL3430	3/4" 30° ELBOW
8	3	A314	3/4" CONDUIT LOCKNUTS
*	1	PIPDOP	4 oz. PIPE DOPE
10	1	N34T3	3/4" x 3" NIPPLE
11	3	HC402	3/4" NO THREAD CONNECTOR
12	3	SLPIGTAIL25G	25' SIDELIGHT PIGTAIL WITH GROUND
13	1	SS5012	STAINLESS STEEL WRAPLOCK 50'
14	1	CABLEGRIP1	SINGLE EYE LACE MESH 0.5 - 0.62
15	2	CABLEGRIP3	SINGLE EYE LACE MESH 0.63 - 0.74
*	1	STH40264	SINGLE DUAL LED BEACON CONTROLLER
17	30'	CONDUIT34	3/4" CONDUIT

ITEM NUMBERS #18-#20 ARE NOT INCLUDED IN THE KIT BUT ARE AVAILABLE UPON REQUEST, AND REQUIRED FOR INSTALLATION.

18	-	STCABLIE	STROBE CABLE TIES (TWR. HEIGHT +5 x 1.5)
19	-	STCABLEOB	OBSTRUCTION LIGHT CABLE(1/2 TWR. HT.+30')
20	-	STROBCABLE-3	STROBE CABLE (TWR. HT. + 30')

* = ITEMS NOT SHOWN
~ = ITEMS QUANTITY CALCULATED ACCORDING TO STRUCTURE HEIGHT.

NOTES:

- ITEM #17 CUT TO LENGTH FOR PROPER EXTENSION OF OL1 (6"-12") FROM STRUCTURE. ATTACH ITEM #11 TO UNTHREADED CONDUIT TO COMPLETE ASSEMBLY.
- MOUNT BEACON HINGE SO LENS WILL OPEN UNOBSTRUCTED BY STRUCTURE.
- ON AM TOWER APPLICATIONS, KEEP GROUND LUG FROM BEING CONNECTED TO EARTH GROUND. GROUND TO THE TOWER ONLY.
- THIS DRAWING IS PROVIDED AS A GENERAL REFERENCE. TWR LIGHTING, INC. DOCUMENTATION SUPERSEDES THIS DRAWING & SHOULD BE REVIEWED PRIOR TO INSTALLATION OF THIS SYSTEM.
- USE COUPLING THAT IS PROVIDED WITH ITEM #17.

LK1E1DBSL TOWER LIGHTING KIT CABLE RUN
(TOWERS 201'/61M TO 350'/107M/10' FACE WIDTH MAX)

PROD DEPT
SERV DEPT
ENGINEER

TWR Lighting, Inc.
Enlightened Technology®

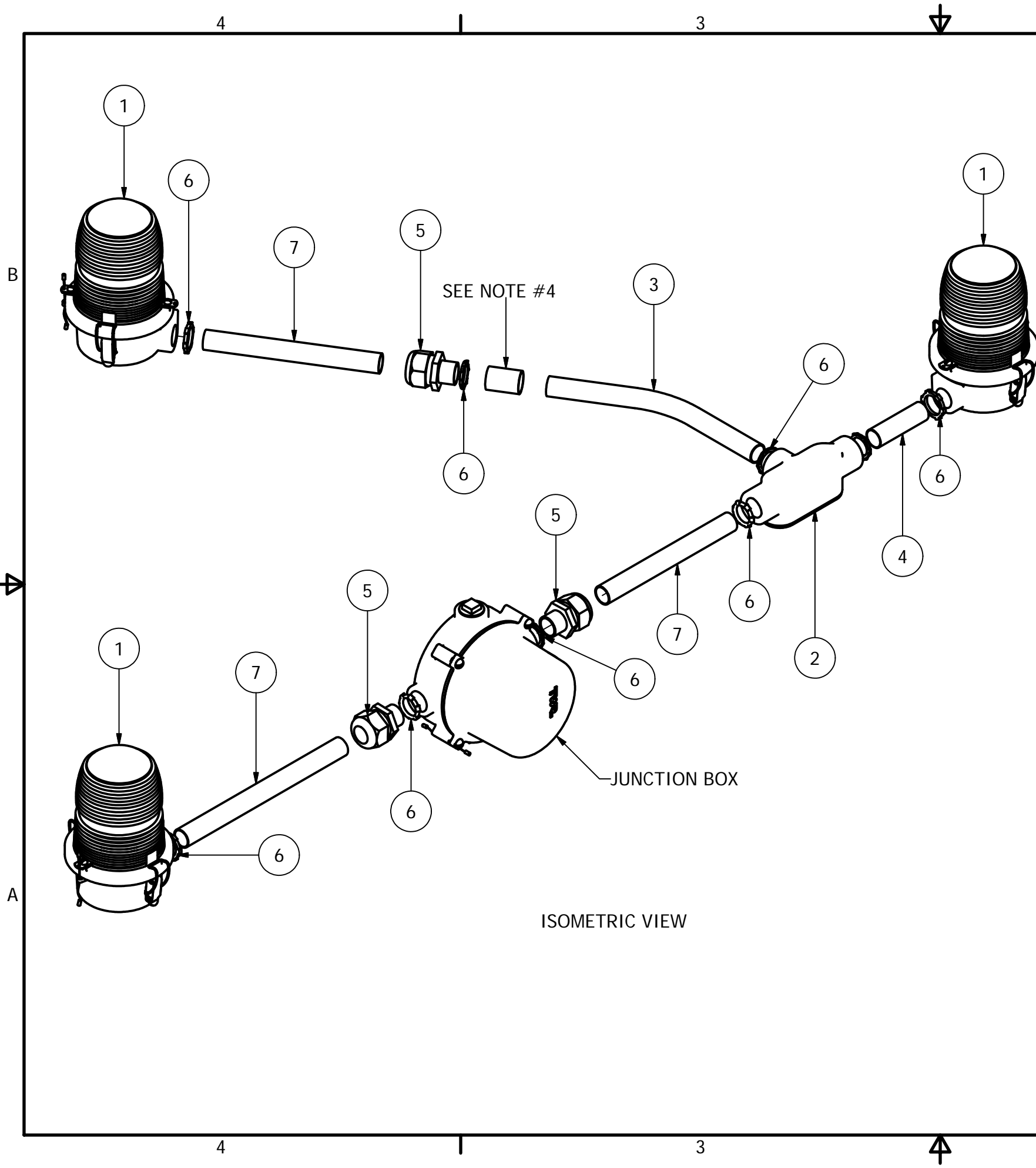
DRAWN BY: E.A.SALAZAR
DATE: 10/08/03
SCALE: N.T.S.

SHEET SIZE: B
SHEET QTY.: 1 OF 1
DWG. NO.: 602

11/12/14 (E) UPDATED LEDS
DATE: LTR. REVISION

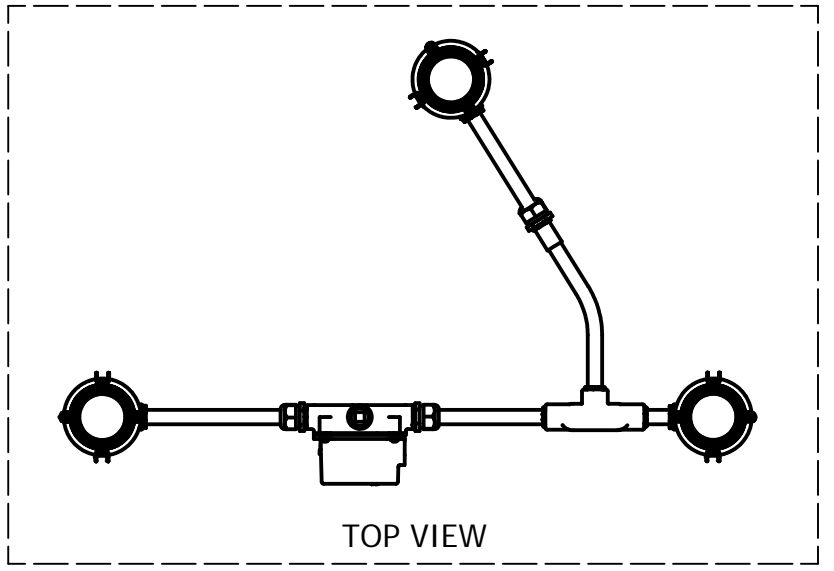
○ = TERMINAL

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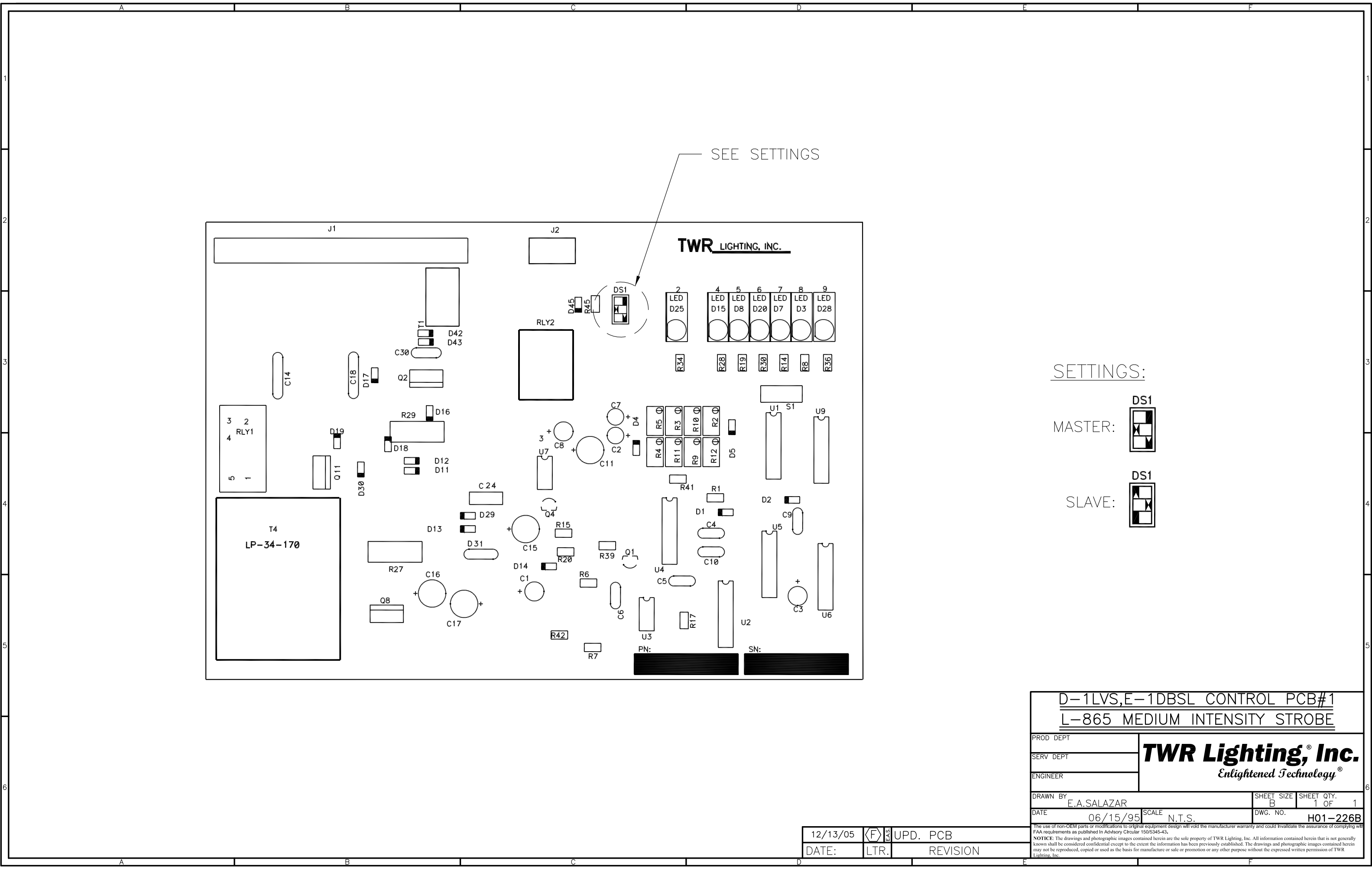
Parts List			
ITEM	QTY	PART NUMBER	DESCRIPTION
1	3	OL1/LED	3/4" OBSTRUCTION LIGHT
2	1	T27CG	3/4" CONDULET W/COVER AND GASKET
3	1	EL3430	3/4" 30° ELBOW
4	1	N34T3	3/4" X 3" NIPPLE
5	3	HC402	3/4" NO THREAD CONNECTOR
6	5	A314	3/4" CONDUIT LOCKNUTS
7	1	CONDUIT34	3/4" CONDUIT

- NOTES:
1. THIS DRAWING IS A TYPICAL INSTALLATION DETAIL FOR 3 OL-1 PER LEVEL SYSTEM.
 2. PART # EL3430 MAY BE OMITTED WHEN ARRANGING FOUR LEG TOWERS.
 3. PART # COUNDUIT34 CUT TO LENGTH FOR PROPER EXTENTION OF OL1 FROM STRUCTURE (6"-12"). ATTACH PART # HC402 TO UNTHREADED CONDUIT TO COMPLETE ASSEMBLY.
 4. USE COUPLING THAT IS PROVIDED BY PART # CONDUIT34.
 5. GREEN WIRE USED ONLY ON LED SIDELIGHTS

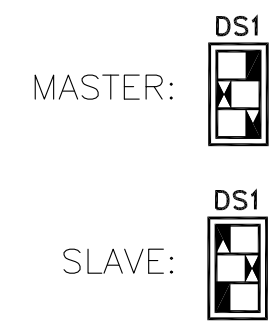


DRAWN jbustamante	1/4/2008	TWR Lighting, Inc. <i>Enlightened Technology®</i>		
CHECKED				
QA				
MFG				
APPROVED				
		TITLE SIDELIGHT MOUNT ASSEMBLY (10' FACE WIDTH MAX)		
		SIZE B	DWG NO 100489	REV A
		SCALE	SHEET 1 OF 1	

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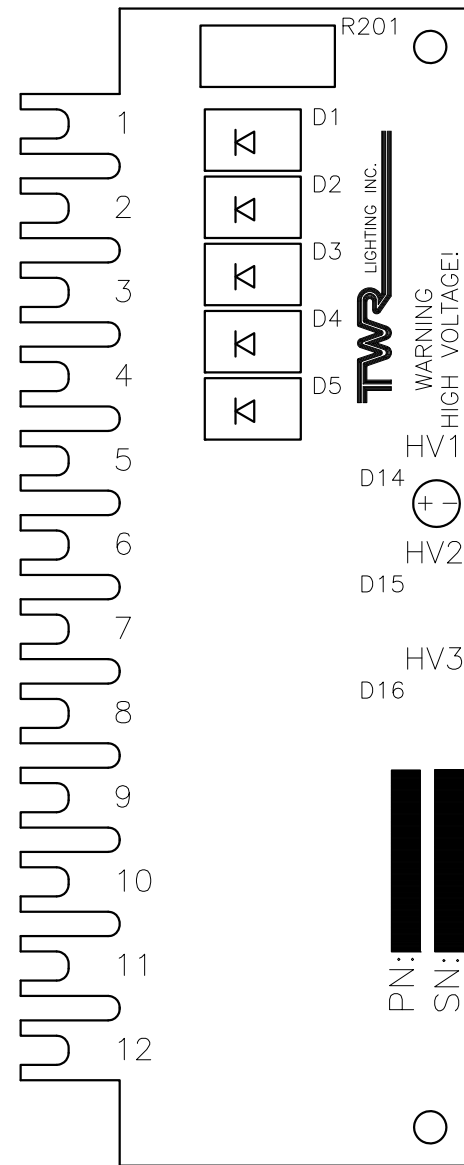


SETTINGS:



D-1LVS, E-1DBSL CONTROL PCB#1			
L-865 MEDIUM INTENSITY STROBE			
PROD DEPT	TWR Lighting, Inc. Enlightened Technology®		
SERV DEPT			
ENGINEER			
DRAWN BY E.A.SALAZAR	SHEET SIZE B	SHEET QTY. 1 OF 1	
DATE 06/15/95	SCALE N.T.S.	DWG. NO. H01-226B	
12/13/05	(F)	UPD. PCB	
DATE:	LTR.	REVISION	

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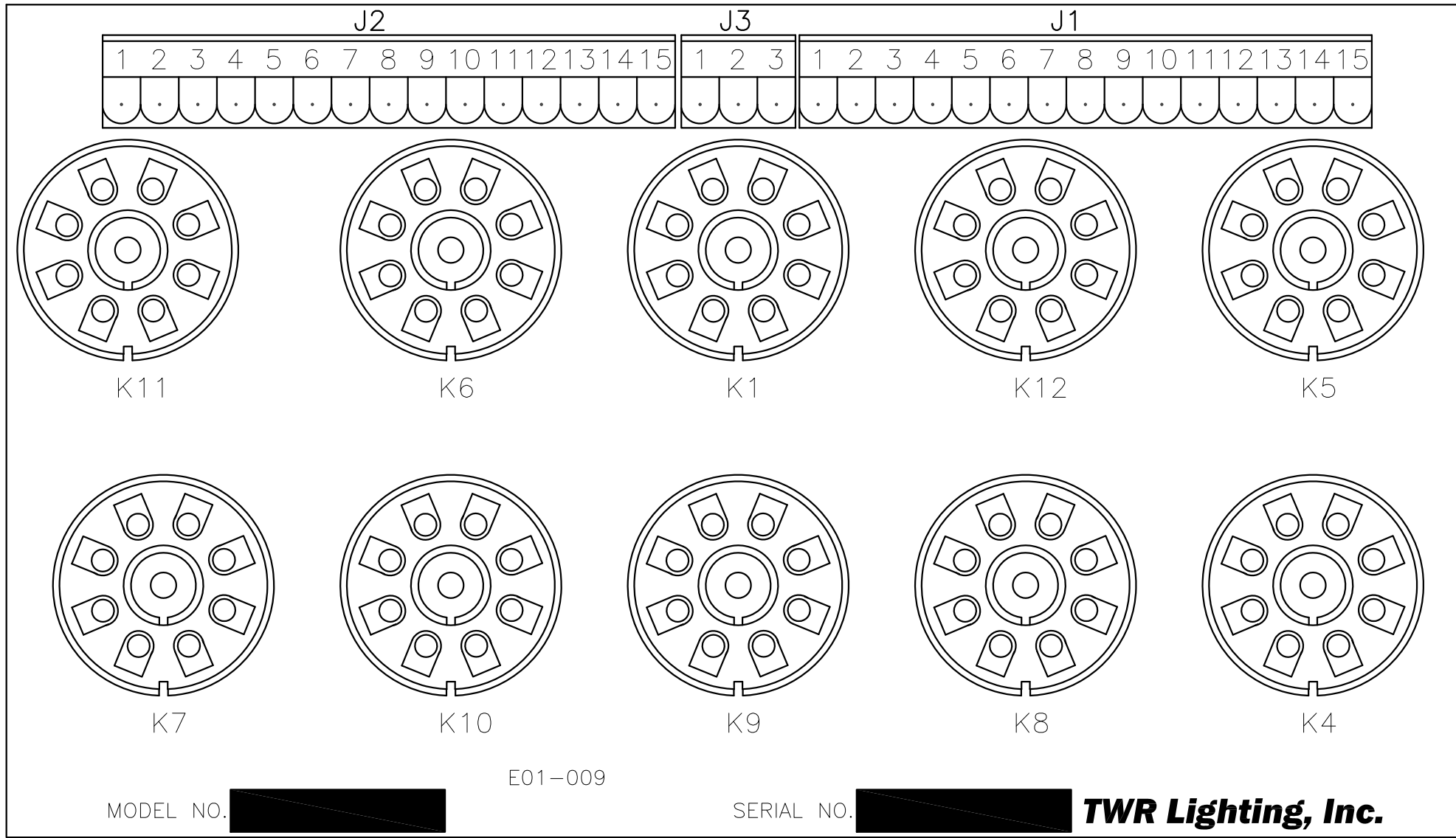


HIGH VOLTAGE RECTIFIER PCB

PROD DEPT	TWR Lighting, Inc. <i>Enlightened Technology®</i>		
SERV DEPT			
ENGINEER			
DRAWN BY E.A.SALAZAR	SHEET SIZE B	SHEET QTY. 1 OF 1	
DATE 11/07/98	SCALE FULL	DWG. NO. H02-226A	

05/13/03	(A)	UPDATED DWG
DATE:	LTR.	REVISION

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E1DBSL RELAY PCB3 PART #STH03264A			
ALARM LOCKOUT ELIMINATION MODIFICATION			
PROD DEPT	TWR Lighting, Inc. <i>Enlightened Technology®</i>		
SERV DEPT			
ENGINEER			
DRAWN BY E.A.SALAZAR	SHEET SIZE B	SHEET QTY. 1 OF 1	DWG. NO. H03-264A
DATE 07/13/06	SCALE N.T.S.		

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4

3

2

1

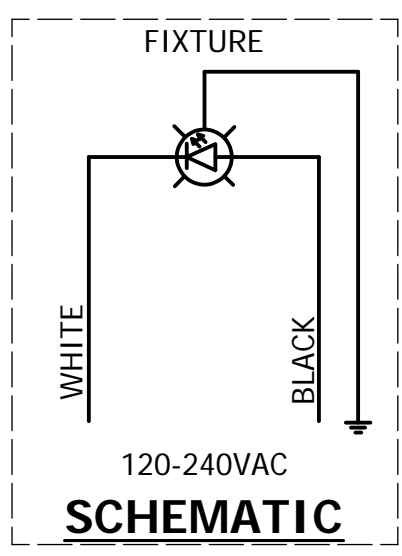
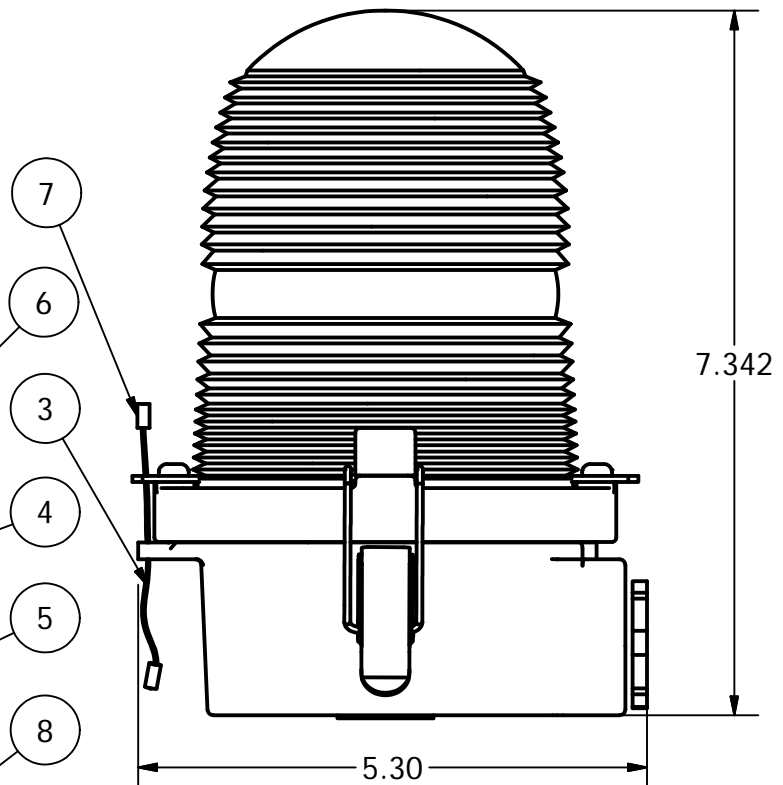
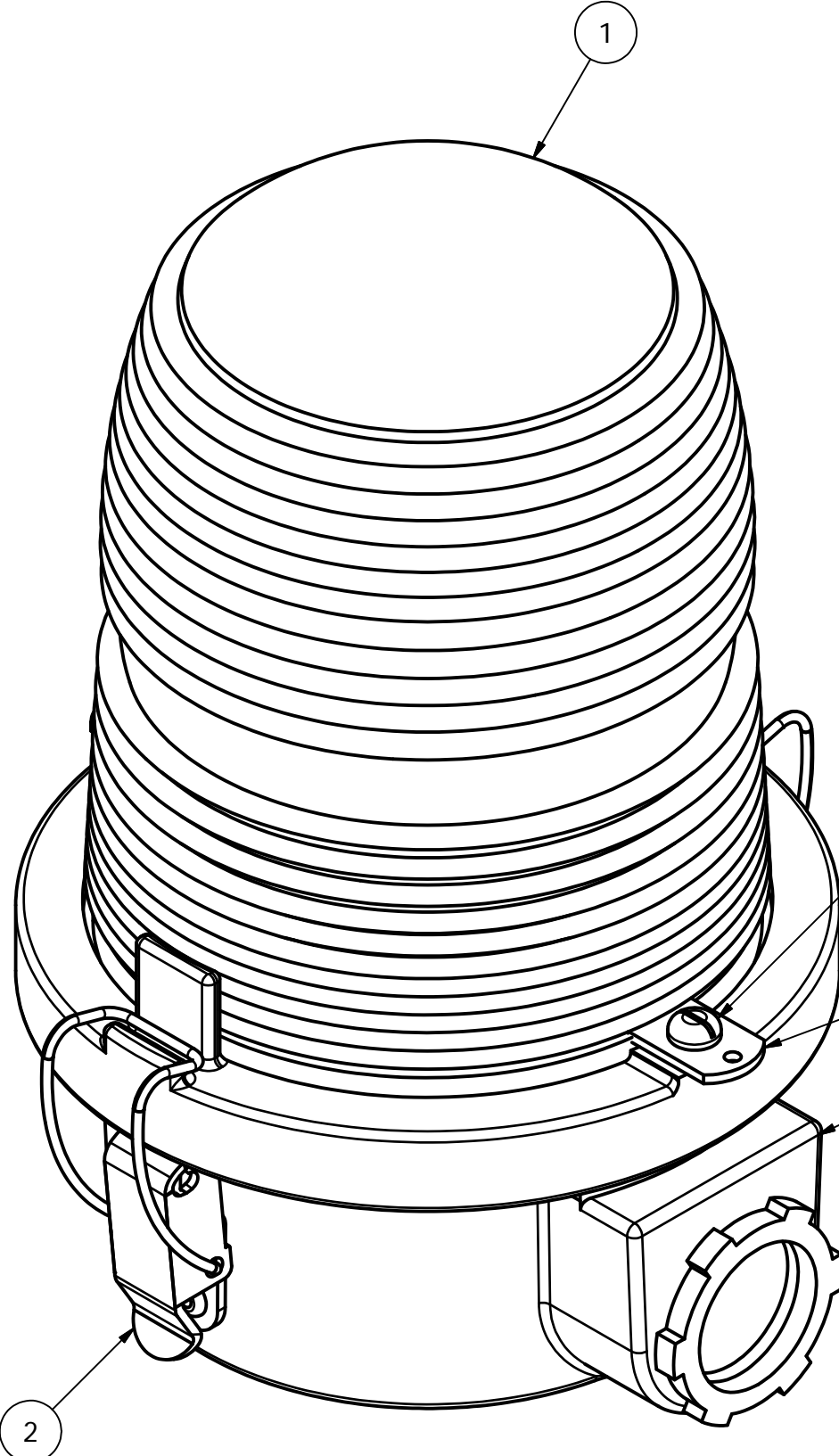
Parts List

ITEM	QTY	PART NUMBER	DESCRIPTION
1	1	OL1VLED2	L810 OBSTRUCTION LIGHT
* 1.1	1	100588_RE	OL 6LED BASE PLATE
* 1.2	1	100591	OL 6LED STAR DISK
* 1.3	1	100680	OL1/2 SERIAL # LABEL
* 1.4	1	A10290	5/32" ID RUBBER GROMMET
* 1.5	6	STD05008	LED EMITTER
* 1.6	1	OLG	OL GASKET
* 1.7	1	AP100846	SIDELIGHT LENS CLEAR ACYRLIC
* 1.8	1	106V	LENS HOLDER RING
* 1.9	6	STE01-047	LED VERTICAL PCB
* 1.10	16	18PRSS	1/8 X .45 SS POP RIVET
* 1.11	1	PS90-260/24	POWER SUPPLY
* 1.12	1	20RED	#20AWG RED BELDON WIRE
* 1.13	2	WIRENUTBLU	BLUE WIRE NUT
2	2	HC255SS	SIDELIGHT LATCH
3	1	7X7SS	1/16 HOL 7X7 S.S. WIRE
4	2	12V245	OL LENS CLIP
5	1	105V	SINGLE SIDELIGHT BODY
6	2	832X14PH	8-32 X 1/4 PH SS SLOT SCREW
7	2	A1A	STAKON CRIMP
8	1	A314	3/4" CONDUIT LOCKNUT GALV.

* = ITEMS NOT SHOWN

B

B



* GROUND WIRE MUST BE CONNECTED TO PROPERLY PROTECT POWER SUPPLY. FAILURE TO GROUND WILL VOID ALL WARRANTIES.

A

A

DRAWN	gsebek	8/18/2004
CHECKED		
QA		
MFG		
APPROVED		

TWR Lighting, Inc. **PARK**
Enlightened Technology

TITLE
 OL1VLED2 120-240VAC FAA-OL16LED
 (L810 OBSTRUCTION LIGHT)

SIZE B DWG NO 100656i REV E
 SCALE SHEET 1 OF 1

DATE	REV	AUTHOR	DESCRIPTION
11/07/14	E	JZAMORANO	REM. WIRE CONNECT

4

3

2

1

AC UNITS CURRENT MEASUREMENT RM22JA31MRSP01

120VAC PRODUCT SPECIFIC SETTINGS

QTY.	PART NO.	INPUT	#1	#2	#3	#4	#5
1	OL1_LED2	E2	*<1	30	20	30	OFF
2	OL1_LED2	E2	*<1	50	20	30	OFF
3	OL1_LED2	E3	*<1	15	20	30	OFF
4	OL1_LED2	E3	*<1	25	20	30	OFF
6	OL1_LED2	E3	*<1	35	20	30	OFF
8	OL1_LED2	E3	*<1	45	15	30	OFF
10	OL1_LED2	E3	*<1	60	10	30	OFF
1	LEDBEAON2	E3	*<1	20	20	30	OFF
1	LEDBEAON2A	E3	*<1	15	20	30	OFF
1	LEDBEAON2(T)	E3	*<1	25	20	30	OFF
1	STLDBEAON2	E3	*<1	20	20	30	OFF
1	STLDBEAON2A	E3	*<1	15	20	30	OFF
2	STLDBEAON2A	E3	*<1	25	20	30	OFF
2	STLDBEAON2A	E3	*<1	25	20	30	OFF

*NO MEMORY

FUNCTIONS

- 1) Configuration: Selection of operation mode (<1 / >1 / >1<) with or without memory.
- 2) Adjustment of current threshold as % of setting range.
- 3) Hysteresis adjustment from 5% to 50%.
- 4) Time Delay adjustment from 0.1 to 30sec.
- 5) Diagnostic button.
- 6) Yellow indicator light (**See conditions below**)
- 7) Dial Pointer (Green) LED
 - Steady green LED indicates that supply to the RM22 is present
 - Flashing green LED indicates a setting has been changed that requires a power cycle.

YELLOW LED CONDITIONS

NOTE: () ASTERISK INDICATES LED CONDITIONS OPERATE OPPOSITE FROM RM22JA31MR MODULE

*

- ➔ Steady Burn Fixtures
 - Yellow light *off : Normal condition (no alarm)
 - Yellow light flashing : Undercurrent condition detected and time delay initiated
 - Yellow light *on : Alarm condition
- ➔ Flashing Fixtures
 - Yellow light flashing inconsistent : Normal condition (no alarm)
 - Yellow light flashing consistent : Under current condition detected and time delay initiated

NOTE : To help troubleshoot or to set the sense current, turn the time delay to 0sec. Adjusting the current setting should only be done if it is known that all the lights are functioning. For Steady Burn adjust the current until the yellow LED comes *off, and the relay is not dropping in and out. For Flashing Fixtures adjust the current setting until the yellow light starts to flash. This is the normal condition setting. Return the time delay back to 30sec.

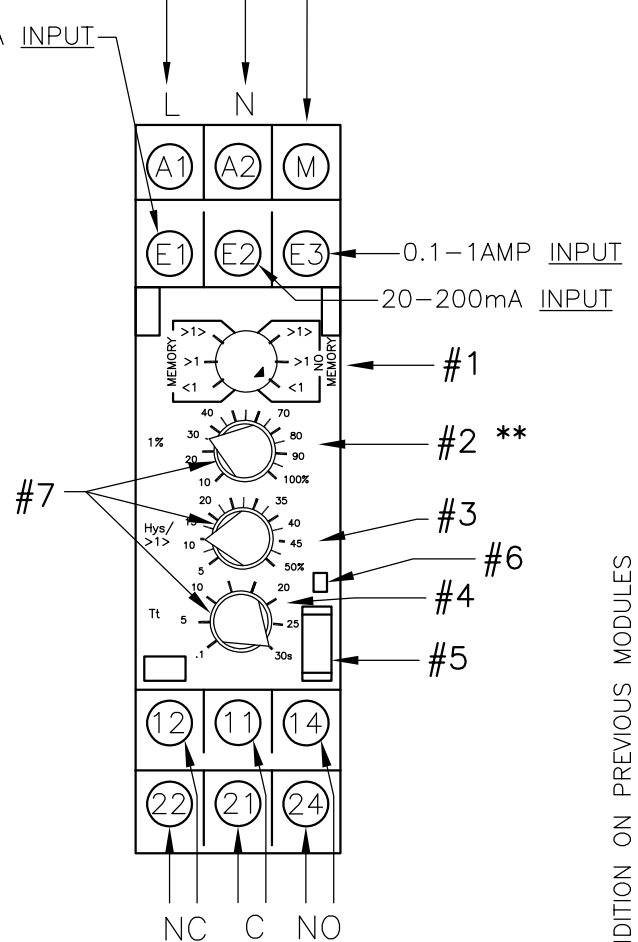
- Yellow light *on : Alarm condition

** Due to current draw tolerances slight adjustments to setting #2 may be needed for proper alarming.

CONTROL VOLTAGE INPUT

4-40mA INPUT

OUTPUT TO LOAD



4

3

2

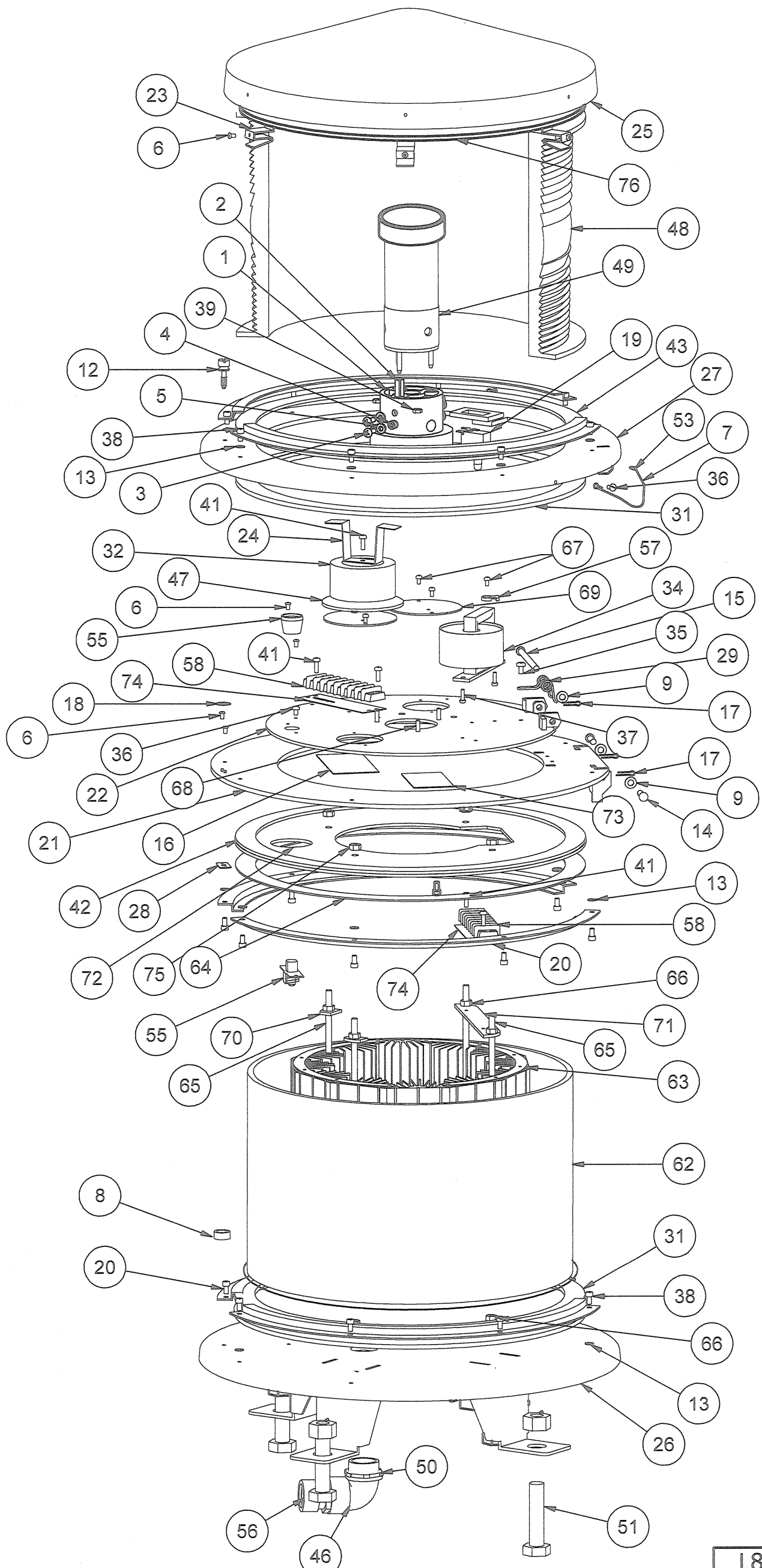
1

B

B

A

A



Parts List

ITEM	QT	PART NUMBER	DESCRIPTION
1	1	100319	DUAL BEACON FLASHTUBE SOCKET
2	3	BU27200	FLASHTUBE SOCKET INSERT
3	6	1032X12PHH	10-32 X 1/2 PHILLIPS BINDER SCREW
4	3	115510SS0	5/16 X 1/4 ROUND SS SPACER
5	3	1032FW	#10 SS FLAT WASHER
6	10	18PRSS-2	1/8 X .40 SS POP RIVET
7	2	7X7SS	1/16 HOL 7 X 7 SS WIRE
8	1	2-10000	CIRCULAR SPIRIT LEVEL
9	3	14FWDB	1/4 FLAT WASHER CH16L
10	2	* 18AWG BLU	#18AWG TEFLON BLUE WIRE
11	2	* 18AWG BRN	#18AWG TEFLON BROWN WIRE
12	1	121340712	DB QUICK OPEN CAPTIVE SCREW
13	24	8NFW	#8 NYLON FLAT WASHER
14	2	14X34CLVP	1/4 X 3/4 SHORT SS CLEVIS PIN
15	1	14X358CLVP	1/4 X 3-5/8 LONG SS CLEVIS PIN
16	1	STCONLAB2	Product Label
17	3	12SSCP	1/2" SS COTTER PIN
18	1	1261	SS RETAINER FOR QUICK OPEN
19	1	STJ02003	CHERRY SWITCH
20	6	100337	DUAL BEACON LENS RETAINER RING
21	1	100343	DUAL BEACON LOWER HINGE ASSEMBLY
22	1	100345	DUAL BEACON HATCH PLATE
23	6	100368	DUAL BEACON CAP BRACKET
24	1	100396	INDUCTOR BRACKET
25	1	100344	CAP DUAL BEACON
26	1	100672	LED BEACON BASE
27	1	100342	DUAL BEACON UPPER HINGE ASSEMBLY
28	1	121102013	DB QUICK OPEN SCREW FLAT RECEPTACLE
29	1	070-4500	DB HATCH SPRING SS DWG100558
30	1	* 16AWG BLK	#16AWG TEFLON BLACK WIRE
31	2	STBEAGSKT	GASKET NEOPRENE 13 1/4 X15
32	1	INDTRC3001	INDUCTOR .47MH TRANSFORMER
33	1	* 16AWG RED/BLK	#16AWG TEFLON RED/BLACK WIRE
34	1	STC05005	TRIGGER TRANSFORMER
35	1	1032X38PHH	10-32 X 3/8 PHILLIPS PAN HEAD SCREW
36	5	832X14PHH	8-32 X 1/4 PH SS SLOT SCREW
37	2	632X38PHH	6-32 X 3/8 PHILLIPS PAN HEAD SCREW
38	24	1032X38PHW	10-32 X 3/8 SS PHILIP HD CAPTIVE SCREW
39	3	832NUT	8-32 NUT
40	2	* 18RAD18277	T&B CONNECTOR
41	5	832X12PHH	8-32 X 1/2 PHILLIPS PAN HEAD
42	1	STBEAGSKT4	GASKET NEOPRENE 1/8 X 15
43	1	STBEAGSK2	GASKET NEOPRENE 3/16 X 15 1/4
44	14	* TYZ23M	HI TEMP TY WRAPS
45	1	* 14RB10R	T&B CONNECTOR
46	1	EL190S	1" 90 DEGREE SHORT ELBOW GALV
47	1	100394-02	INDUCTOR BOTOM PAD GASKET
48	1	STDBCLENS	CLEAR DB LENS
49	1	STFLSHTB8KIT	FLASH TUBE 2-TURN HELIX WITH HOOD CAP
50	1	A315	1" CONDUIT LOCKNUT GALVANIZED
51	4	58X112	A325 5/8 X 1-1/2 BOLT W/ANCO L/NUT
52	1	* HEATSHRINK2	1/2" GLUE BASE HEAT SHRINK
53	4	CSL062X100	1/16 COPPER SLEEVE
54	.25	* HEATSHRINK1	1/4" BLACK FIT 221- 1/4 BLK-100
55	1	162320141	SOUTHCO SPRING LATCH W/BLACK KNOB
56	1	CC-MPT-1-G	1" CORD CONNECTOR .700 TO .984
57	2	TYANCHOR	TY WRAP ANCHOR 23N3669
58	2	621R208	621 R2 08 TERMINAL BLOCK
59	11	* 18RA6FL	STAKON
60	7	* 14RB-6FL	14-16 AWG #6 LOCKING FORK
61	3	* KV10-8F-D	10-12 AWG #8 LOCKING FORK
62	1	STLDBCTUBE2	CLEAR ACRYLIC TUBE 18.5"
63	1	LEDLITEENG2A	120 VAC L-864 LED LIGHT ENGINE
64	1	STBEAGSK3	GASKET NEOPRENE 1/16 X 15-1/4
65	4	100727	1/4-20 X9 7/8
66	4	1420NUT	1/4-20 NUT W/NYLON
67	4	632X14PHH	6-32 X 1/4 PHILLIPS PAN HEAD SCREW
68	3	832X58PHH	8-32 X 5/8 PHILLIPS PAN HEAD SCREW
69	2	100599M	HATCH PLATE VENT COVER
70	2	100606I	RETAINING WASHER
71	1	100722	TERMINAL MOUNTING PLATE
72	1	100602M	TOP LED ENGINE PLATE
73	1	NONOEMLBL	NON-OEM PARTS WARNING LABEL
74	2	MS621XP08	MS621XP08
75	4	1420SSNUTN	1/4 20 S/S NUT W/NYLON
76	1	100634	TOP SEAL PLATE

* = ITEMS NOT SHOWN

L865/864 LED DUAL BEACON ASSEMBLY (STLDBEACON2A)

PROD DEPT
SERV DEPT
ENGINEER

TWR Lighting, Inc. HARK
Enlightened Technology®

DRAWN BY	J.ZAMORANO	SHEET SIZE	B	SHEET QTY.	1 OF 1
DATE	10/28/2014	SCALE	N.T.S	DWG. NO.	101008i

The use of non-OEM parts or modifications to original equipment design will void the manufacturer warranty and could invalidate the assurance of complying with FAA requirements as published in Advisory Circular 150/5345-43.

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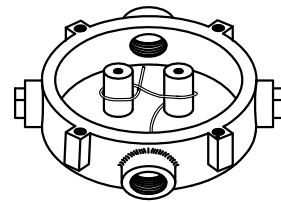
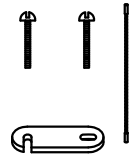
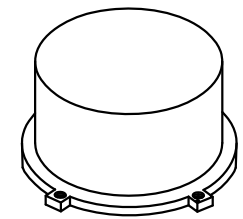
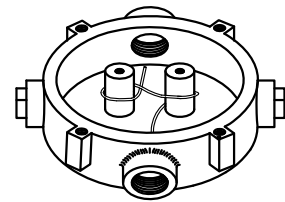
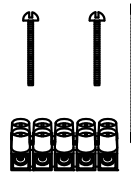
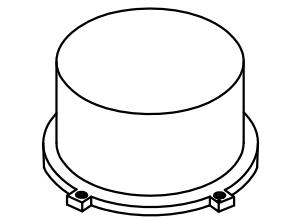
AUTHOR	DATE	REV	DESCRIPTION
JZAMORANO	03/03/2015	A	UPDATED B.O.M

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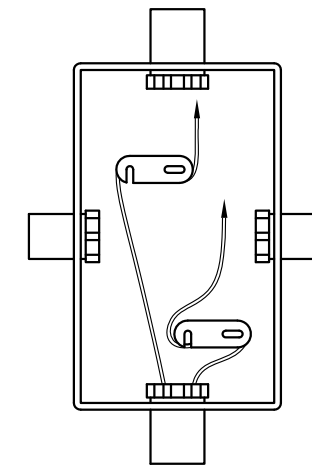
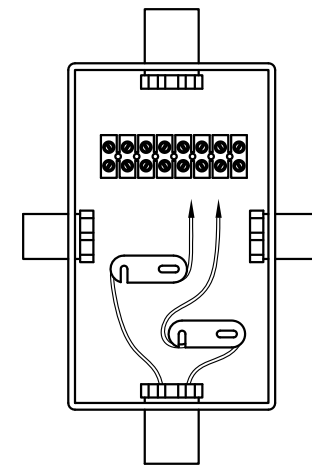
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2

1



JB-5 AND JB-0
3/4" JUNCTION BOX



JB-8 AND JB-8SR
1" JUNCTION BOX

NOTES:

- 1) DRAWING ILLUSTRATES METHOD OF STRAIN RELIEVING WIRE. USE THIS METHOD ON ALL JUNCTION BOXES.
- 2) THE NATIONAL ELECTRICAL CODE-ARTICLE 300-19-B3 REQUIRES CONDUCTORS IN A VERTICAL CONDUIT BE SUPPORTED TO RELIEVE STRAIN ON TERMINAL BLOCK CONNECTIONS.
- 3) SKETCH ILLUSTRATES METHOD OF STRAIN RELIEVING A SINGLE CONDUCTOR. SEVERAL CONDUCTORS MAY BE GROUPED TOGETHER.
- 4) CONDUCTORS MAY BE MIXED BUT SHOULD NOT TAKE UP MORE THAN 40% OF CONDUIT'S INSIDE AREA.

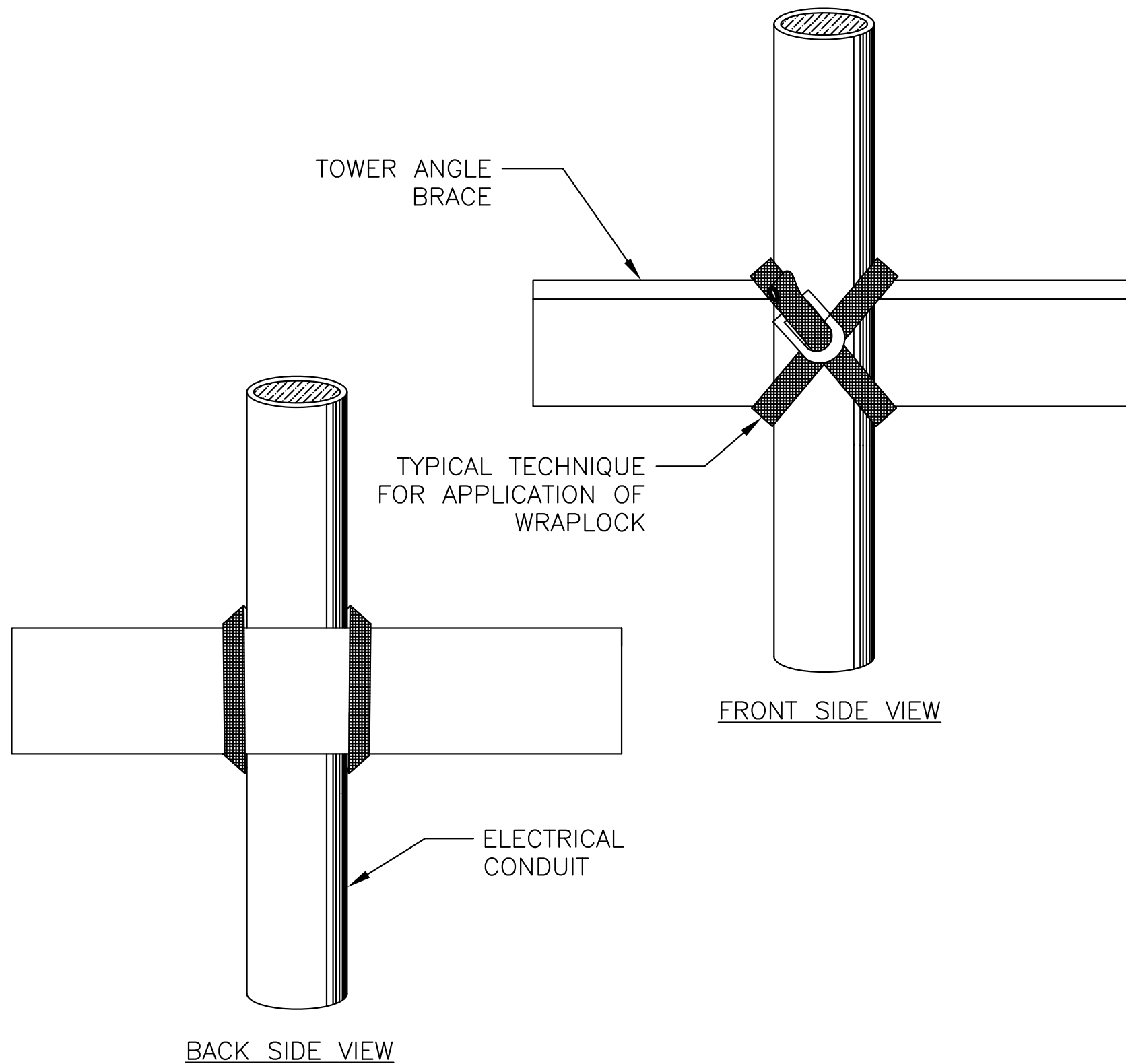
USING THIS JUNCTION BOX METHOD SPACING IS 100 FEET MAXIMUM.

AWG WIRE SIZE	MAX. NUMBER WIRES IN 3/4" CONDUIT	MAX. NUMBER WIRES IN 1" CONDUIT	WIRE AREA SQ. INCHES	WEIGHT PER 100 FEET
12 THHN	16	26	0.0117	2.50
10 THHN	10	17	0.0184	4.10
8 THHN	6	9	0.0373	6.70
6 THHN	4	7	0.0519	10.30
4 THHN	2	4	0.0845	16.20

<u>JUNCTION AND STRAIN RELIEF BOXES</u>					
PROD DEPT	TWR Lighting, Inc. <i>Enlightened Technology®</i>				
SERV DEPT					
ENGINEER					
DRAWN BY	G.D. SEBEK	SHEET SIZE	B	SHEET QTY.	1 OF 1
DATE	07/26/93	SCALE	N.T.S.	DWG. NO.	100089

9/29/00	(A)	UPDATED NOTES
DATE:	LTR.	REVISION

The use of non-TWR parts or modifications to original equipment design will void the manufacturer warranty and could invalidate the assurance of complying with FAA requirements as published in Advisory Circular 150/5345-43.
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DIRECTIONS FOR USING WrapLock

CUT OFF BAND TO PROPER LENGTH.
(SEE TABLE ON COVER OF BOX)

1.— PASS ONE END THROUGH YOKE AND BEND BACK ABOUT 1 1/2" AND FLATTEN DOWN.



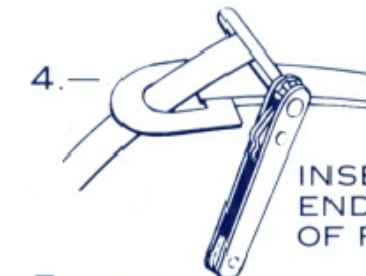
2.— PASS BAND AROUND WORK AND THROUGH YOKE.



3.— REPEAT AND PASS END THROUGH A SECOND TIME, DRAW UP FREE END SNUGLY WITH PLIERS.



4.—



INSERT FREE END IN SLOT OF RATCHET.

5.—



TURN DOWN UNTIL CLAMP IS TIGHT.

6.— BACK OFF SLIGHTLY TO REMOVE RATCHET. CLAMP IS NOW SECURELY LOCKED.

TO REMOVE WrapLock
UNCOIL END WITH RATCHET. PRESS DOWN AT POINT WHERE BAND METAL HAS BEEN FORCED THROUGH CURVED PART OF YOKE.

WRAPLOCK FASTENING DETAIL

ENGINEER	TWR Lighting, Inc. <i>Enlightened Technology®</i>		
APPROVED			
APPROVED			
APPROVED	DRAWN BY M. PETERMAN	SHEET SIZE B	SHEET QTY. 1 OF 1
APPROVED	DATE 05/01/2014	SCALE N.T.S.	DWG. NO. 100984

The use of non-OEM parts or modifications to original equipment design will void the manufacturer warranty and could invalidate the assurance of complying with FAA requirements as published in Advisory Circular 150/5345-43.
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