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-1DB**_____

SERIAL # _____

PURCHASE DATE _____

PURCHASED FROM _____

Dual Medium Intensity Strobe
Model E-1DB

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APPENDIX

Dual Medium Intensity Strobe
Model E-1DB

1.0 INTRODUCTION

TWR Lighting, Inc.'s Model E-1DB Type L-864/L-865 Controller has been designed and built to the Federal Aviation Advisory Circular 150/5345-43E 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-1DB Controller is for use on lighting structures or towers (201' to 350' AGL) that are approved to be lighted with Dual White/Red Flashing Medium Intensity Strobes in accordance with the Federal Aviation Administration's (FAA) Advisory Circular 70/7460-1J.

1.2 SPECIFICATIONS OF EQUIPMENT

Dimensions:	
Controller (H X W X D) / Weight	30.50" X 20.0" X 8.0" / 95.0 lbs
Mounting Dim (H X W)	31.25" X 14.0"
Beacon Height / Weight	28.0" / 36 lbs
Cable Diameter / Weight per 100 ft.	.625" +/- 10% 24 lbs
Electrical Voltage:	120 VAC +/- 10% 60 Hz (Standard) 240 VAC +/- 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	360E
Vertical	3E Minimum
Flash Rate:	
White Daymode	40 fpm +/- 2 fpm
Red Nightmode	22 fpm +/- 2 fpm
White Nightmode (Back-up mode)	40 fpm +/- 2 fpm
Wattage:	
Daymode	95 Watts
Red Nightmode	310 Watts
White Nightmode	35 Watts
Temperature:	+55EC / -55EC
Beacon Wind Load:	2.1 ft^2

2.0 INSTALLATION

W A R N I N G — D A N G E R ! ! !
THIS SYSTEM OPERATES AT HIGH VOLTAGE LEVELS THAT COULD BE LETHAL TO SERVICE PERSONNEL. ALL INSTALLATION AND MAINTENANCE WORK SHOULD 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 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-269 and HDO-269 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.

2.3 PHOTOCELL WIRING (Refer to Drawings HDO-269 and H40-269)

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 "COM," the black wire is connected to the socket terminal marked "B," and the red wire is connected to the socket terminal marked "R." These socket connections are made by using .25" quick connect terminals which must be crimped to the wires. 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 night mode. The photocell housing socket wiring is the same as above.

2.3.1 Connect the **BLACK** wire from the photocell to TB1-8.

2.3.2 Connect the **RED** wire from the photocell to TB1-9.

2.3.3 Connect the **WHITE** wire from the photocell to TB1-10.

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 H40-269)

Power wiring to the control cabinet should be in accordance with local methods and the National Electric Code (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 TB1-11.

2.4.3 Connect the "NEUTRAL" side of the 120V AC line to TB1-12.

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 choose between using strobe cable or conventional conduit wiring methods to wire the strobe beacon. Refer to Lighting Kit Drawings 600-01 and 600-02 for conduit and 600 for cable installations.

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2.5.1 Beacon Mounting and Wiring (Refer to Drawings HDO-269 and INS-269)

2.5.1.1 Bolt the beacon 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.

2.5.1.2 Level the beacon 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.

2.5.2 LIGHTING KIT WIRING

Install wiring between the controller to the beacon utilizing either strobe cable or conduit method. Refer to drawings HDO-269, 600, 600-01, and 600-02, for install 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 29CFT 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 proceed the manual if a conflict occurs.*

All the necessary information for wiring the dual beacon and sidelights is contained on the tower kit drawings 600, 600-01, and 600-02. The connections for the dual beacon and sidelights in the controller are as follows:

2.5.2.1 Connect the 10 gauge *Red/Black* wire from beacon wiring to *TB1-1.*

2.5.2.2 Connect the 10 gauge *Red* wire from beacon wiring to *TB1-2.*

2.5.2.3 Connect the 10 gauge *Black* wire from beacon wiring to *TB1-3.*

2.5.2.4 Connect the 14 gauge *White* wire from beacon wiring to *TB1-4.*

2.5.2.5 Connect the 14 gauge *White/Green* wire from beacon wiring to *TB1-5.*

2.5.2.6 Connect the 14 gauge *Green* wire from beacon wiring to the ground screw left of *TB1.*

2.5.2.7 Connect the 16 gauge *Brown* wire from the beacon wiring to *TB1-6.*

2.5.2.8 Connect the 16 gauge *Blue* wire from beacon wiring *TB1-7.*

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 S1.

2.5.2.11 Connect the ground wire (if cable is used) from sidelight wiring to ground screw right of TB1.

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 H40-269 and

M01-269.

2.6.1 White Strobe Failure (SF)

Connect the customer's alarm common to plug J3 terminal #5. Connect the customer's alarm wire to plug J3 terminal #4 for normally open (or) terminal #6 for normally closed monitoring.

2.6.2 Red Strobe Failure (RF)

Connect the customer's alarm common to plug J3 terminal #11. Connect the customer's alarm wire to plug J3 terminal #10 for normally open (or) terminal #12 for normally closed monitoring.

2.6.3 Power Failure (PF)

Connect the customer's alarm common to plug J3 to terminal #14. Connect the customer's alarm wire to plug J3 terminal #15 for normally open (or) terminal #13 for normally closed monitoring.

2.6.4 Photocell (PC)

Connect the customer's alarm common to plug J3 terminal #8. Connect the customer's alarm wire to plug J3 terminal #7 for "off" operation (or) terminal #9 for "on" operation monitoring.

2.6.5 Sidelight Alarm (SA)

Connect the customer's alarm common to plug J3 terminal #2. Connect the customer's alarm wire to plug J3 terminal #1 for normally open (or) terminal #3 for normally closed monitoring.

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 day mode operation. Check for status of strobe beacon. Turn "on" switch S1 on PCB 1 and status should change after an four (4) second delay. After test, turn switch S1 to the normal operating position.

2.7.2 Red Strobe Failure (RF)

Red strobe failure testing can be performed in the night mode operation. Check for status of strobe beacon. Turn "off" switch SW2 on controller panel and status should change after a eight (8) second delay. This testing will cause the unit to go into the back-up white strobe operation. To clear this situation, turn on switch SW2 and reset the breaker.

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 Photocell (PC)

Controller should be in the day mode of operation when performing this test. Check status of operation. Turn switch SW1 on (or) cover the photocell and operation status should change state. After test, turn switch SW1 to the normal operating position.

2.7.5 Sidelight Alarm (SA)

Controller should be in the night mode of operation. Check status of operation. Pull fuse switch S1 open. Alarm should occur within five (5) seconds. After test, re-engage fuse switch S1.

2.8 CONTROLLER CONFIGURATION (Refer to Drawing H01-269)

This unit is factor setup to be a master controller. If this unit is to be used in conjunction with an additional unit, change dip switch settings as drawing indicates. The following connections will need to be interfaced between systems.

2.8.1 Connect at least an 18/20 gauge wire from PCB 1 connector P1-15 from unit setup to be the master unit to PCB 1 connector P1-15 of unit setup to be the slave unit.

2.8.2 Connect at least an 18/20 gauge wire from TB1-9 of master unit to slave unit TB1-9.

2.8.3 Connect at least an 18/20 gauge wire (ground) from one chassis to the other chassis.

2.8.4 Use a single breaker for supply power to all controllers.

2.8.5 Follow standard instructions provided in the manuals supplied with the controllers.

3.0 THEORY OF OPERATION

3.1 THE POWER SUPPLY

The AC line is sent to transformers T2 through fuse F2 MOVMOD1 and relay K1. In order for K1 to energize and complete the circuit to T1, the safety interlock switch CSS, BSS, must be closed. The BSS switch is located in the base of the beacon. In order for the system to operate, the beacon and the power supply must be closed and secured.

Transformer T1 secondary output is around 900 VAC. These outputs are sent to the high voltage rectifier PCB (PCB #2) and converts the 900 VAC of the transformer to around +550V DC and -550V DC in daymode and +700V DC and -550V DC in nightmode. This high voltage is then used to charge the energy storage capacitor C102 through current limiting resistor R31, T3 and steering diode D5 for nightmode operation. Resistor R31 and R31A are by-passed through K5 for daymode operation.

Energy storage capacitors bank C103-110 is used for the daymode operation and are connected to the high voltage through the normally closed contacts of relay K5. When the light level drops below 3 foot candles the photocell supplies 120V AC to relay K5 which removes C103-110 from the discharge path leaving capacitor C102 in the circuit for nightmode operation. The energy storage capacitor banks are connected to the flashtube through the interconnecting tower wiring.

3.2 THE FLASHTUBE

The flashtubes FT1 (daymode) and FT2 (nightmode) are quartz tubes containing two (2) electrodes each. The electrode at the positive (+) end is called the anode and is connected to the positive side of the storage capacitors through inductor L1, and L2. 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 transformers T4 and T5), 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 deonizes returning to its nonconducting 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 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 1.2 seconds to operate the flashtube during daylight hours. The second is a burst at 100 Hz to elongate the apparent flash during the night time hours at reduced flash energy.

3.4 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.

3.5 ALARM CIRCUITS

3.5.1 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 K7 (on PCB #3) that the customer can connect to their alarm transmitting devices. The alarm point can be accessed on J3 of PCB #3.

3.5.2 Red Strobe Failure (RF)

Red Strobe Failure alarm circuit monitors each flash of the nightmode flashtube within the beacon. If the flashtube fails to flash (for any reason), the alarm circuit operates relay K8 (on PCB #3) that the customer can connect to their alarm transmitting devices. The alarm point can be accessed on J3 of PCB #3.

3.5.3 Power Failure (PF)

The power failure alarm relay is energized during normal operation. Should the power be removed for any reason, then relay K1 would drop, creating an alarm for the customer alarm transmitting device.

3.5.4 Photocell (PC)

The photocell alarm relay K4 is energized whenever the photocell or SW3 is on. This relay will allow the customer to monitor the modes of operation to determine if switch from day to nightmode has occurred.

3.5.5 Sidelight Alarm (SA)

Module M1 monitors the current flowing to the sidelights. This module can monitor from (1-4) 116W lamps. Factory setting is generally for three (3) lamps. When the current falls to two (2) amps (1 lamp less than the factory setting), then the onboard relay will engage, creating an alarm which is then sent to PCB #3.

3.6 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.

*** * C A U T I O N * ***

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.

3.7 STROBE 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:

3.7.1 Control Power On

Line from the 120V AC input is sent through safety switches CSS, BSS, isolation transformer T2 and fuse F11 on PCB #1. Once this low voltage is at PCB #1, it is rectified, then sent to LED4 (D5). If for any reason power is interrupted, (beacon opened, controller door open, blown F1 fuse, failed relay, etc.) LED4 would be extinguished.

3.7.2 High Voltage

The Cathode side of the high voltage HV is routed through a current limiting resistor (R201). When the unit is in daymode, 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.

3.7.3 Trigger Voltage

The trigger voltage from fuse F41 (PCB #4) is sent to current limiting resistor R1 and LED6 (D11). Under normal circumstances, the red LED should be at full intensity indicating voltage to be normal. An absence of this indication means that the voltage is no longer present.

3.7.4 Nightmode

Output voltage from the photocell (SSR) is connected to the coil of relay K4 on PCB #3. Whenever the photocell senses the darkness or switch SW1 is on, relay K4 will energize, thereby sending 120V to relay U2. Relay U2 will supply 12V DC to the timing circuit as well as LED7 (D7). LED7 will glow a constant red when in the nightmode.

3.7.5 Primary Timing

The primary timing pulses are received at LED8 (D12). 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 in daymode or nightmode back-up operation. The strobe unit in nightmode operation should produce 22 (+/- 2) pulses per minute.

3.7.6 Timing Signal Verify

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

3.7.7 Flash Verified

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 turns it on. Capacitor C15 via Q13 will send voltage to LED1 (D20). After each confirmed flash, LED1 will blink. Absence of a blinking LED signifies that strobe beacon has ceased to flash.

3.7.8 Strobe Fail Test

Switch S1, when turned on, cuts off the timing signal to the trigger circuit and extinguishes LED8 (D12). At this time a strobe alarm should be received at J3. The normal position of switch S1 is off (switch downward).

4.0 TROUBLE SHOOTING

Much of the trouble shooting 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.

4.1 TOOL REQUIREMENTS

In order to be prepared to trouble shoot 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) #2 Phillips Screwdriver
1) Nut Driver or Socket Set
1) Multi meter - Analog or Digital 600V AC / 600V DC Minimum

4.2 DIAGNOSTIC EVALUATION

The first step in trouble shooting 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 should 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) 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 to 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. (See drawings H40-269 and H01-269.)

4.3 TROUBLE SHOOTING ASSISTANCE

4.3.1 Flash Verify LED - Out

4.3.1.1 Observe high voltage LED (D14) on the same beacon circuit to determine if it is available. If the LED is dim or out completely, then

check the high voltage capacitor bank (C103 - C110 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 dim or off, check fuse F41. If blown, replace with exact type of fuse. If the fuse blows again, check transformer T2. 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 beacon.

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 F2. 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 Beacon Alarms (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, check PCB #1 P1-4 for 120V AC output. If voltage is okay, go to the next step.

4.3.4.2 Check relay K7 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 or about eight (8) seconds. This delay period can be tested by throwing "on" *(upward)* switch S1 (on the circuit board #1). After testing, return switch S1 to its normal *(downward)* position.

4.3.5 False or Nonexistent Beacon Alarm (RF)

If alarm trips when the system appears to be working normally or fails to show an alarm when there is an obvious failure, check relay K8 coil for an open condition. Normal resistance should be around 2K ohm. If coil is open, replace K8.

4.3.6 No Red Strobe Operation

4.3.6.1 Check if switch SW2 is on. If switch is off, turn switch to the on position *(upward)*. If okay, go to the next step.

4.3.6.2 Turn switch SW1 to the on position (upward). On the breaker at the service panel to the lights, turn off then back on. If the beacon comes on then the unit fail-safes back to the white back-up mode of operation, then replace the red mode flashtube.

***Note**: Once the unit fail-safes, you will need to reset the breaker at the panel in order to release the latched relay in this circuit anytime a failure has been detected. This is an important fact to remember when trouble-shooting this system.*

5.0 MAINTENANCE GUIDE

*** * W A R N I N G - H I G H - V O L T A G E * ***
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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 flashtubes 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 BEACON BEFORE STARTING ANY WORK ON THE BEACON.

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

5.1.4 Install the new night mode 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 Open the internal hatch plate latch and let it recline open.

5.1.7 Disconnect the quick release connector connected to the cable

running through the tube.

5.1.8 Loosen the three (3) socket screws with a #2 Phillips screwdriver.

5.1.9 To remove the flashtube, slide the lamp down to the cable.

5.1.10 To install a flashtube, slide the lamp over the connector on to the cable with the lamp in the base up position.

5.1.11 Insert the flashtube with the pins aligned with the socket.

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

5.1.13 Reconnect cable connection.

5.1.14 Close the hatch and latch securely.

5.1.15 Close the upper hinge assembly and latch securely.

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 advisory circular 70/7460-1J. By following these instructions, maximum safety and performance can be achieved.

Tools Required: None

5.2.1 LAMP REPLACEMENT

5.2.1.1 Unclasp the two (2) latches and let the bail recline back.

5.2.1.2 Lift the lens up and over the lamp letting the lens hang from the safety cable.

5.2.1.3 Unscrew the lamp counter-clockwise and remove.

5.2.1.4 Install the new lamp by screwing the lamp clockwise.

5.2.1.5 Reinstall the lens making sure it is seated properly on

the base.

5.2.1.6 Reclasp the two (2) latches.

5.3 POWER SUPPLY

The only required maintenance to be performed is periodic inspection/cleaning of the vent filter. Monthly inspections should be made at first to familiarize yourself with the power supply's particular maintenance requirements. Maintenance intervals can vary due to location, seasonal weather conditions, and general housekeeping of site.

The filter is located on the inside of the enclosure on the lower right hand side.

Tools Required: None

5.3.1 Turn off power at breaker panel.

5.3.2 Open the controller door.

5.3.3 Disconnect P1 connector from PCB #1.

5.3.4 Remove PCB #1 from track.

5.3.5 Slide filter up and remove from bracket.

5.3.6 Wash filter with water and squeeze until all excess water is removed. If no water is available, then knock out dust from filter before reinstalling.

5.3.7 Reinstall filter into bracket.

5.3.8 Reinstall PCB #1.

5.3.9 Reconnect P1 connector to PCB #1.

5.3.10 Close the controller door.

5.3.11 Turn on power at breaker panel.

5.4 PHOTOCELL

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

6.0 MAJOR COMPONENTS LIST

SCHEMATIC TAG #	DESCRIPTION	PART NUMBER
BSS1	BEACON SAFETY SWITCH	STJ02003
C101	3 UF 660V AC CAP	STB99008 CSI
C102	4 UF 2.5 KV CAP	STB99010
C103 - C110	40 UF 1KV CAP	STB99006
CSS	CABINET SAFETY SWITCH	STJ02001
FAN	AXIAL FAN	EP123815LBT
F1	1 amp FUSE	KTK1
F2	10 amp FUSE	KTK10
F11	½ amp FUSE	FUSE.5
F41	1/8 amp FUSE	FUSE.125
FT1	DAYMODE FLASHTUBE	STFLSHTB6
FT2	NIGHTMODE FLASHTUBE	STFLSHTB7
K1, K4, K6, K8	DPDT OCTAL RELAY	X99KE
K2, K3	HV BLEEDER RELAY	STJ10006
K5	DPDT OCTAL RELAY	KRPA11AG120
K7	SPDT OCTAL RELAY	X9KE
K9	TIME DELAY RELAY	SPEC224
L1	INDUCTOR	INDCTR3001
L2	INDUCTOR	100453
M1	CURRENT SENSOR	SRCR430T
MOVMOD1, MOVMOD 2	SURGE SUPPRESSOR	DTK-120HW
MOV3, MOV4	METAL OXIDE VARISTOR	Z1000LA80A
P1, P2, P3	15 POSITION PLUG	PLUG
PCB1	E-1DB CONTROL PCB	STH01269

Dual Medium Intensity Strobe
Model E-1DB

SCHEMATIC TAG #	DESCRIPTION	PART NUMBER
PCB2	HIGH VOLTAGE RECTIFIER PCB	STH02226
PCB3	RELAY PCB	STH03269
PCB 4	TRIGGER VOLTAGE RECTIFIER PCB	STH04269
PHOTOCELL	120V AC PHOTOCELL	P2455L
R31	150 ohm 225W	STA22003
R32	25K ohm 20W	STA08020
R33	2.4 MEG 2W	ST08010
S1	5 amp FUSE	KTK5
SW1, SW2	SPDT 10 amp SWITCH	STJ01002
T1	FERRORESONANT TRANSFORMER	STC30019
T2	ISOLATION TRANSFORMER	100272
T3	BURSTING CHOKE	100273
T4, T5	TRIGGER TRANSFORMER	STC05005
TB1	12 PART TERM BLK	TERMBLK-12
TB2	12 PARK TERM BLK	TERMBLK 141-12
TB3	4 PART TERM BLK	TERMBLK 141-4
TB4	3 PART TERM BLK	CURBLK
TLS1	THERMAL LIMITING SWITCH/210	STJ10008
TLS2	THERMAL LIMITING SWITCH/130	STJ10010
	BURSTING CHOKE	100273
	FLASHTUBE SOCKET	100319
	CONNECTOR SOCKET	EGG-2B308CYM
	CONNECTOR PLUG	FGG-2B308CYCD99
	HINGE GASKET	STBEAGSKT
	LENS GASKET	STBEAGSKT2

Dual Medium Intensity Strobe
Model E-1DB

SCHEMATIC TAG #	DESCRIPTION	PART NUMBER
	CLEAR LENS	STDBCLENS
	DB STROBE BEACON FIXTURE	STDBEACON
	STROBE BEACON CABLE	STROBCABLE-3
	SIDELIGHT CABLE	STCABLE0B
	VENT FILTER	STFILTER

7.0 SUGGESTED SPARE PARTS LIST

QUANTITY	PART NUMBER	DESCRIPTION
2	KTK1	1 amp FUSE
2	KTK10	10 amp FUSE
2	KTK5	5 amp FUSE
2	FUSE.5	½ amp FUSE
2	FUSE.125	1/8 amp FUSE
1	STH01269	E-1DB PCB #1
1	P2455L	120V AC PHOTOCELL

8.0 PRODUCT WARRANTY

TWR LIGHTING, INC. warrants its products against defects in design, material (excluding lamps), or workmanship for a period of one (1) year from the date of installation or for a maximum of two (2) years from date of shipment. TWR LIGHTING, INC. will, at its option, exchange, repair, or credit at the purchase price, for its products returned by the customer. In order for warranty to apply, customer must notify TWR LIGHTING, INC. promptly of any warranty claim and receive a return goods authorization number. Material shall be returned at customer's expense to TWR LIGHTING, INC. for inspection. TWR LIGHTING, INC. will inspect and test the returned material. Adjustment is dependent upon determination that apparent defects have not been caused by misuse, abuse, failure to follow installation or application, unauthorized or improper repair or alteration, accident or negligence in use, storage, transportation or handling. This represents TWR LIGHTING, INC.'s sole warranty liability.

9.0 TWR LIGHTING, INC. RETURN POLICY

Items returned for repair will be returned to TWR LIGHTING, Inc. at customer's expense. A quotation will be issued for parts and labor. Minimum charge for non-warranty repair will be $60.00 for inspection which will be credited to repair on receipt of purchase order. Repair will be made and repair and freight charges invoiced.

All materials returned to TWR LIGHTING, INC. should be insured.

Before returning items for repair, a return goods authorization number should be received from TWR LIGHTING, Inc.

Items should be returned with a completed return goods authorization form giving the model number, serial number, date or purchase, original TWR LIGHTING, Inc. invoice number, the name and phone number of a contact familiar with the problem, and a description of the problem.

RETURN GOODS AUTHORIZATION FORM (RGA)

RGA#: **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:

Dual Medium Intensity Strobe
Model E-1DB

RETURN GOODS AUTHORIZATION FORM (RGA)

RGA#:DATE:

CUSTOMER:

CONTACT: **PHONE NO.:**

ITEM DESCRIPTION (PART NO.):

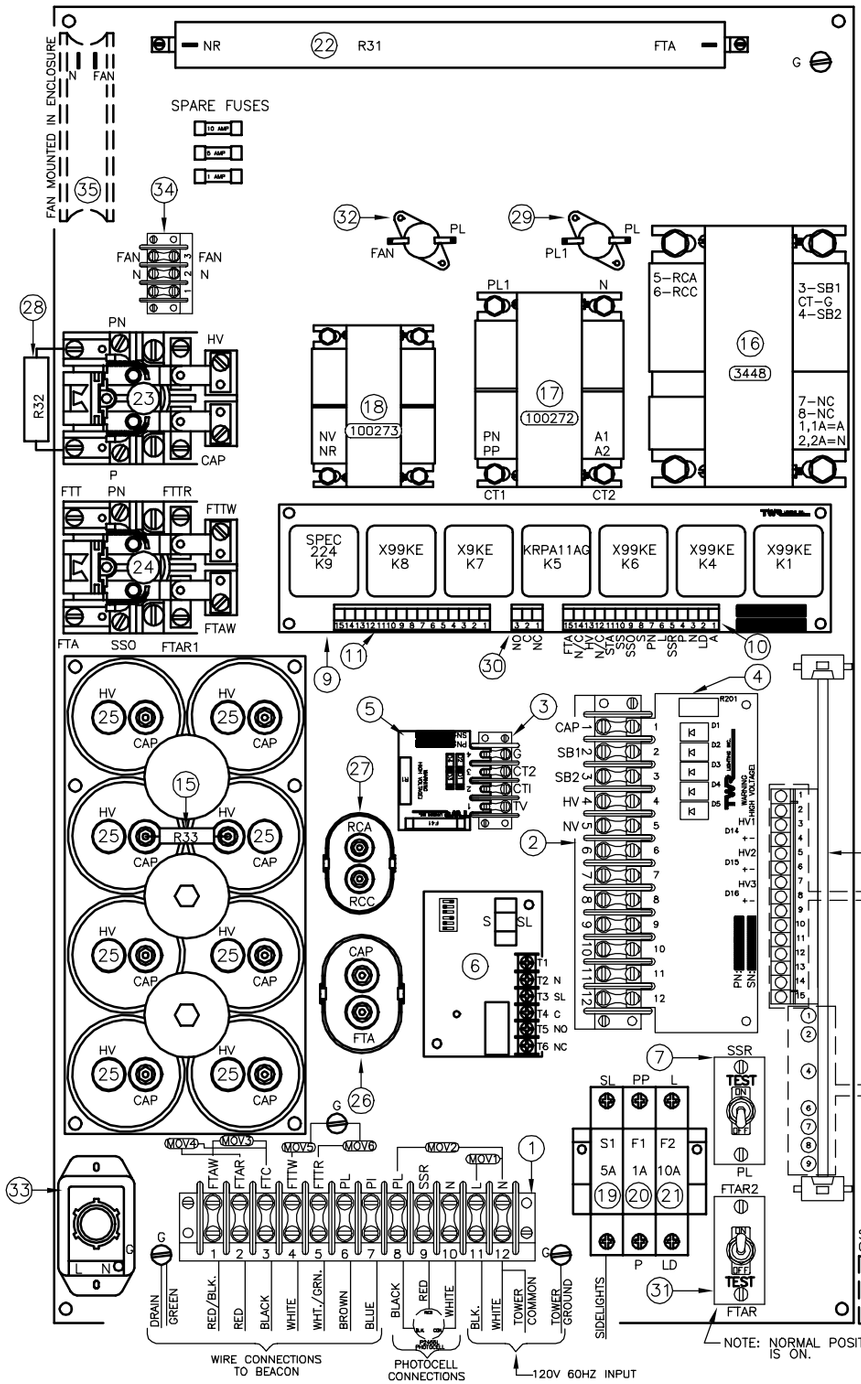
MODEL NO.: **SERIAL NO.:**

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

DESCRIPTION OF PROBLEM:

SIGNED **DATE NEEDED**

RETURN ADDRESS:



CUSTOMER STROBE ALARM POINTS

*J3 CUSTOMER ALARMS

11

NO	SA	(SIDELIGHT ALARM)	
COM			
NC			
OPEN	SF	(WHITE STROBE FAILURE)	
COM			
CLOSED			
OFF	PC	(PHOTOCELL)	
COM			
ON			
OPEN	RF	(RED STROBE FAILURE)	
COM			
CLOSED			
CLOSED	PF	(POWER FAILURE)	
COM			
OPEN			

*CONTACT POINTS SHOWN IN NORMAL OPERATION.

J2 ALARM INTERCONNECT

30

NC	
C	
NO	

NC=NORMALLY OPEN C=COMMON NC=NORMALLY CLOSED

P1 CONNECTIONS

12

1 = FTT	6 = CAP	11 = TV	
2 = FTAR2	7 = FTC	12 = G	
3 = FTARI	8 = SSO	13 = A1	
4 = STA	9 = SS	14 = A2	
5 = P	10 = PN	15 = TS	

LED DIAGNOSTICS

13

LED1: FLASH VERIFY
LED2: RED FLASH FAIL
LED4: CONTROL POWER ON
LED6: TRIGGER VOLTAGE
LED7: NIGHT MODE
LED8: OPERATION SIGNAL
LED9: TIMING SIGNAL VERIFY

ITEM NO.	SCH. TAG NO.	DESCRIPTION
1	TB1	12–POSITION TERMINAL BLOCK
2	TB2	12–POSITION TERMINAL BLOCK
3	TB3	4–POSITION TERMINAL BLOCK
4	PCB2	HV RECTIFIER PCB
5	PCB4	TRIGGER VOLTAGE RECTIFIER PCB
	R1	TRIGGER RESISTOR 1K 20W
	F41	.125A TRIGGER FUSE
6	M1	SCR430T MODULE
7	SW1	PHOTOCELL BYPASS SWITCH
8	CSS	ENCLOSURE SAFETY SWITCH SWITCH IN OFF POSITION FOR NORMAL OPERATION
9	PCB3	RELAY PCB
	K1	POWER/POWER FAIL RELAY
	K4	PHOTOCELL RELAY
	K5	DAY/NIGHT INTENSITY RELAY
	K6	SIDE LIGHT ALARM RELAY
	K7	STROBE FAIL RELAY
	K8	RED STROBE FAIL ALARM RELAY
	K9	RED STROBE FAIL TRANSFER RELAY
10	J1	RELAY PCB CONNECTION
11	J3	CUSTOMER ALARM POINTS
12	P1	CONTROL PCB CONNECTION
13	LED	DIAGNOSTIC LEDS
14	PCB1	TIMING & CONTROL PCB
	F11	.5 AMP FUSE
15	R33	AUXILIARY BLEEDER RESISTOR
16	T1	FERRORESONANT TRANSFORMER
17	T2	ISOLATION TRANSFORMER
18	T3	BURSTING CHOKE
19	S1	5 AMP SIDELIGHT FUSE&FUSE HOLDER
20	F1	1 AMP ISOLATION TRANS. FUSE&FUSE HOLDER
21	F2	10 AMP INPUT FUSE & FUSE HOLDER
22	R31	RESISTOR 50 OHM 225W
23	K2	BLEEDER RELAY
24	K3	WHITE/RED BEACON RELAY
25	C103–C110	DAY CAPACITOR 40uf
26	C102	NIGHT CAPACITOR 4uf
27	C101	RESONANT CAPACITOR 3uf
28	R32	BLEEDER RESISTOR 25K 20W
29	TLS1	THERMAL LIMITING SWITCH 1
30	J2	SIDELIGHT ALARM INTERCONNECT
31	SW2	RED STROBE FAIL TEST SWITCH
32	TLS2	THERMAL LIMITING SWITCH 2 SWITCH IN ON POSITION FOR NORMAL OPERATION
33	MOVMOD1	SURGE ARRESTOR
34	TB4	FAN CONNECTIONS
35	FAN	AXIAL FAN

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 SUPERCEEDES THIS DRAWING AND SHOULD BE REVIEWED PRIOR TO INSTALLATION OF THIS SYSTEM.

*4. FILTER MAINTENANCE/CLEANING SHOULD BE PERFORMED MONTHLY (OR) AS REQUIRED FOR PROPER OPERATION.

E–1DB CHASSIS LAYOUT

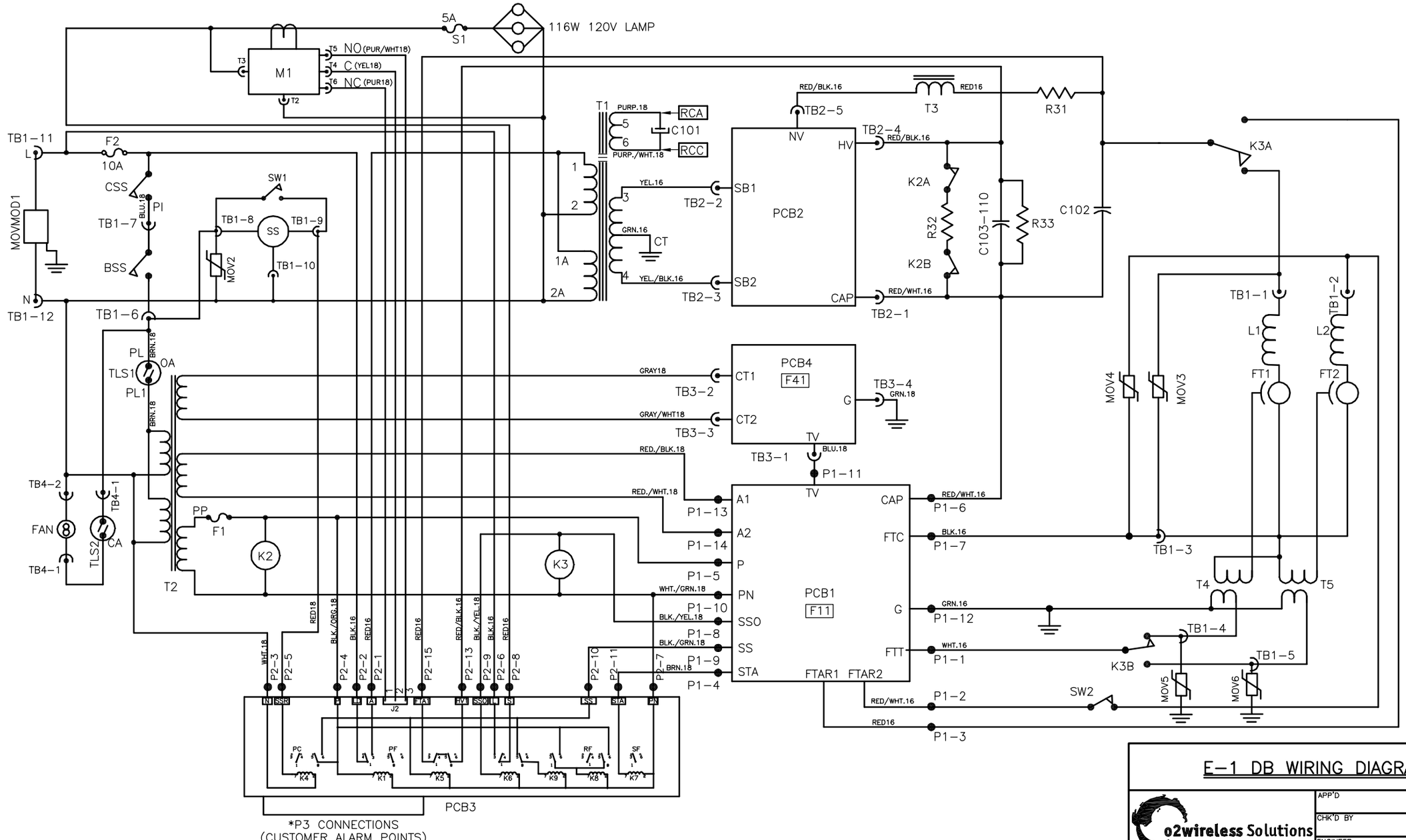
L–864/L–865 DUAL CONTROLLER 120VAC

o2wireless Solutions
TWR lighting division

APP'D
CHK'D BY
ENGINEER

DATE:	LTR.	REVISION
08/23/00	(D)	3 ADDED GRND., MOV5,6
10/23/98	(C)	3 CHG. FUSE BLK. TYPE
08/11/98	(B)	3 UPDATED B.O.M.'S
03/30/98	(A)	3 CHG. ALARM POINTS

DRAWN BY E.A.SALAZAR
SHEET SIZE B
SHEET QTY. 1 OF 1
DATE 06/14/97
SCALE N.T.S.
DRAWING NO. H40–269

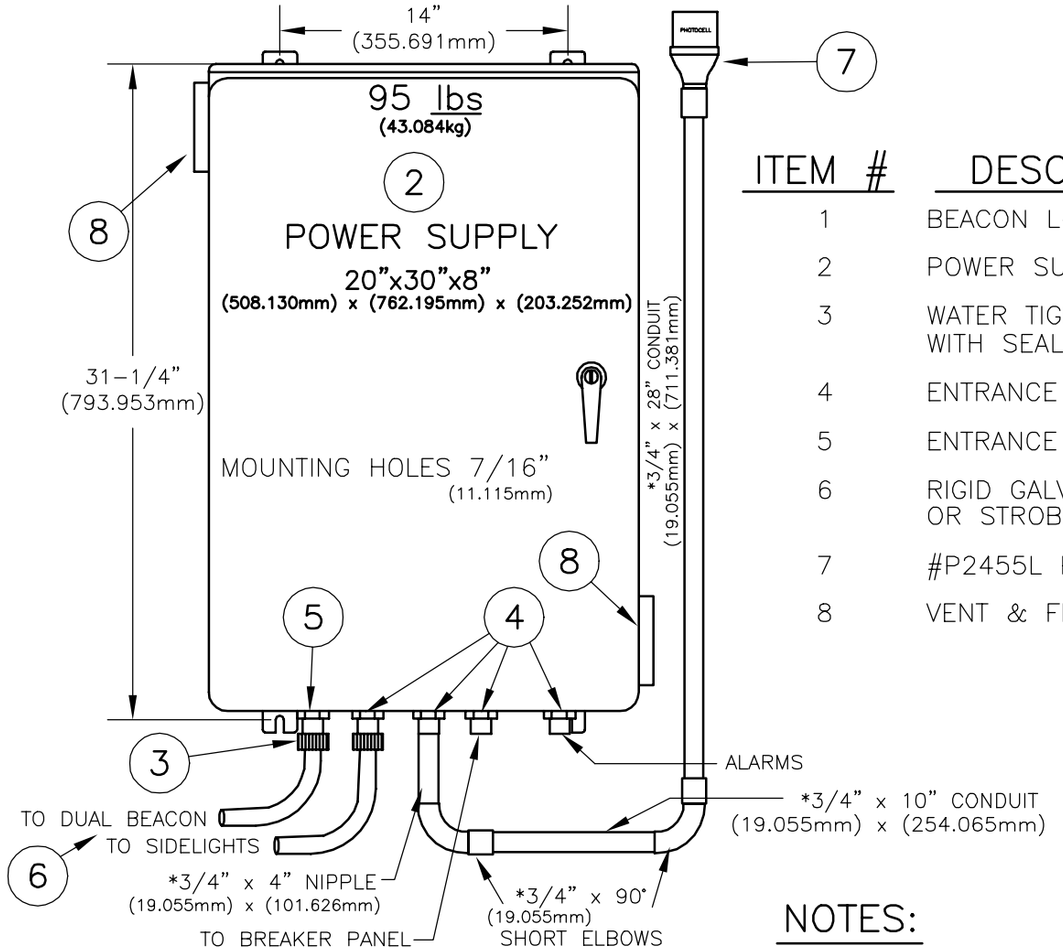


E-1 DB WIRING DIAGRAM

o2wireless Solutions
TWR lighting division

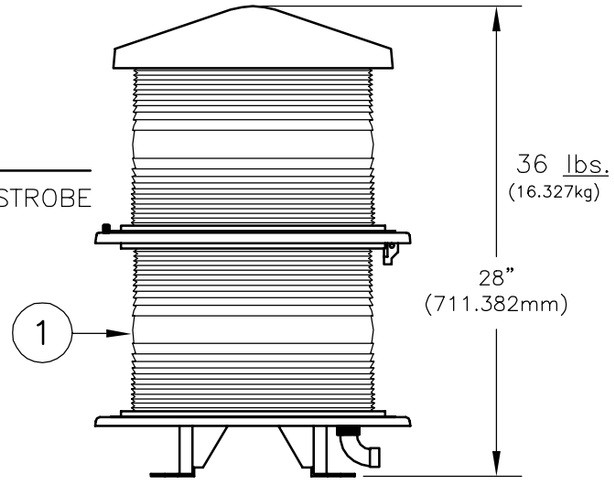
APP'D	
CHK'D BY	
ENGINEER	
DRAWN BY	E.A.SALAZAR
SHEET SIZE	B
SHEET QTY.	1 OF 1
DATE	06/16/97
SCALE	N.T.S.
DRAWING NO.	M01-269

DATE:	LTR.	REVISION
08/23/00	D	REMOVED MOVMOD2
1/12/00	C	ADDED INDUCTOR

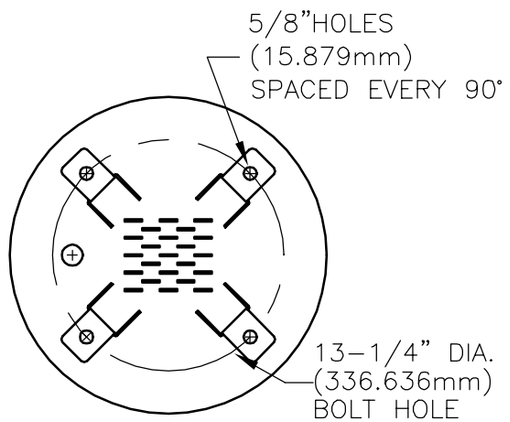


*** = ITEMS NOT INCLUDED BUT ARE AVAILABLE UPON REQUEST.**

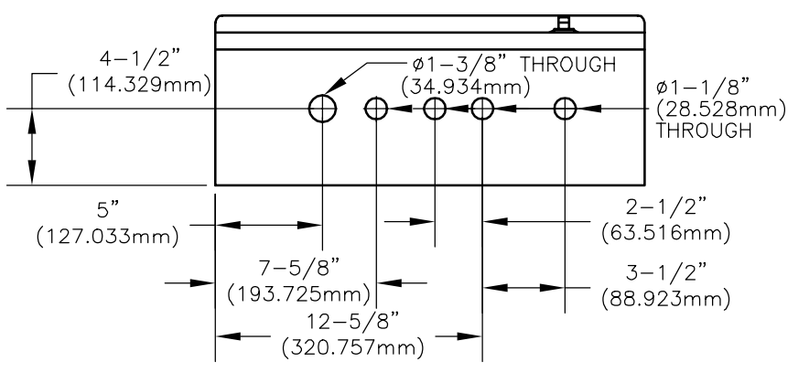
ITEM #	DESCRIPTION
1	BEACON L-864/L-865 DUAL RED/WHITE STROBE
2	POWER SUPPLY E-1DB
3	WATER TIGHT CABLE CONNECTOR WITH SEALING GLAND.
4	ENTRANCE HUB 3/4" (19.055mm)
5	ENTRANCE HUB 1" (25.407mm)
6	RIGID GALVANIZED CONDUIT OR STROBE CABLE.
7	#P2455L PHOTOCELL
8	VENT & FILTER COVER



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" (1219.512mm) TO BOTTOM OF THE ENCLOSURE FOR EASE OF MAINTENANCE.

B. MOUNT BEACON HINGES SO LENS WILL OPEN UNOBSTRUCTED BY STRUCTURE.

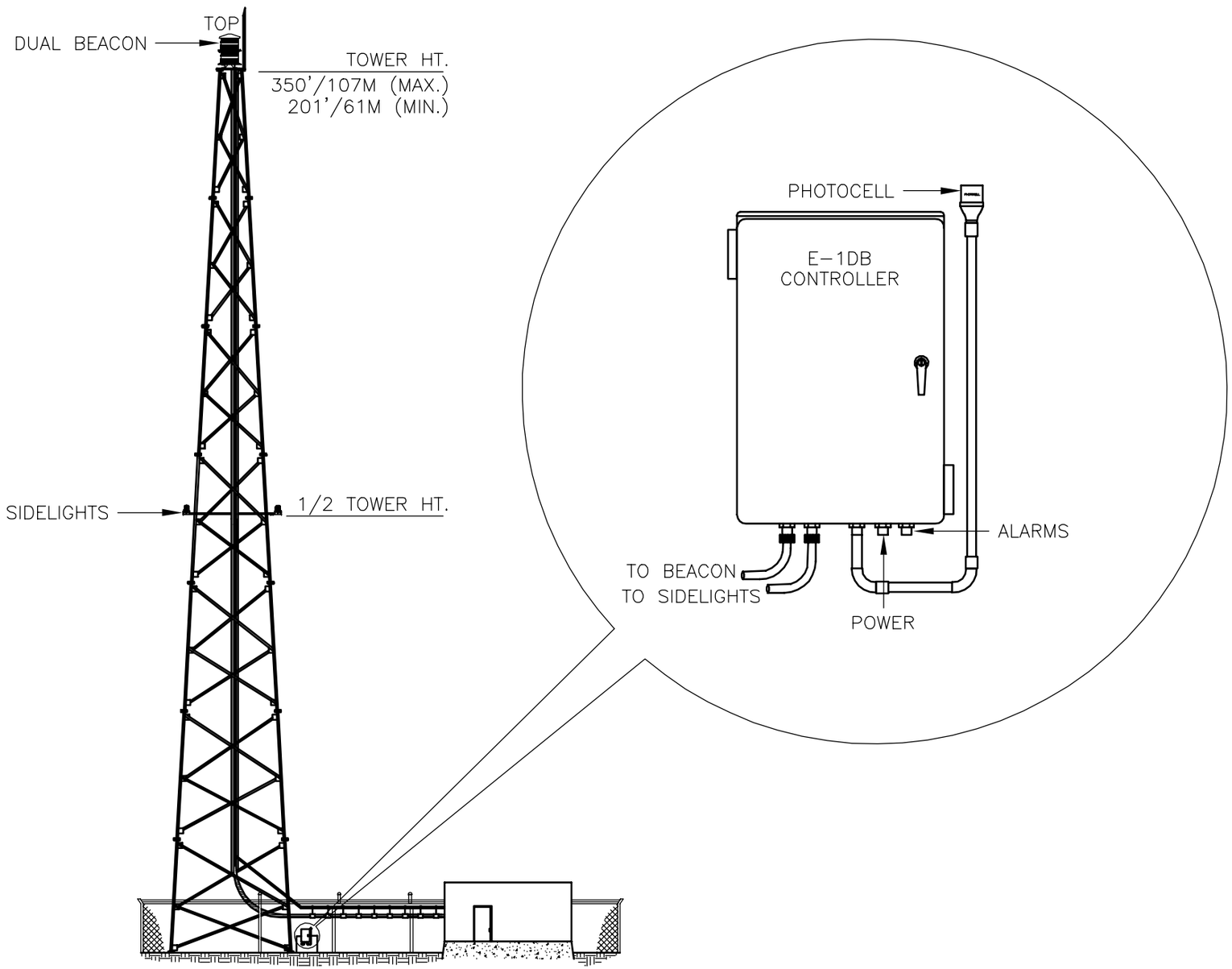
DATE:	LTR.	REVISION
05/24/00	C	CHANGED SPECS

HOUSING DETAILS E-1DB
L-864/L-865 RED/WHITE STROBE

o2wireless Solutions
TWR lighting division

APP'D
CHK'D BY
ENGINEER

DRAWN BY	SHEET SIZE	SHEET QTY.
G.D.SEBEK	B	1 OF 1
DATE: 06/17/97	SCALE: N.T.S.	DRAWING NO.: HDO-269



TYPICAL SITE LAYOUT

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 HD0-269 (CONTROLLER INSTALLATION), 600 (LIGHT KIT CABLE RUN), 600-01(LIGHT KIT CONDUIT & CABLE RUN) AND 600-02 (LIGHT KIT ONLY CONDUIT RUN).

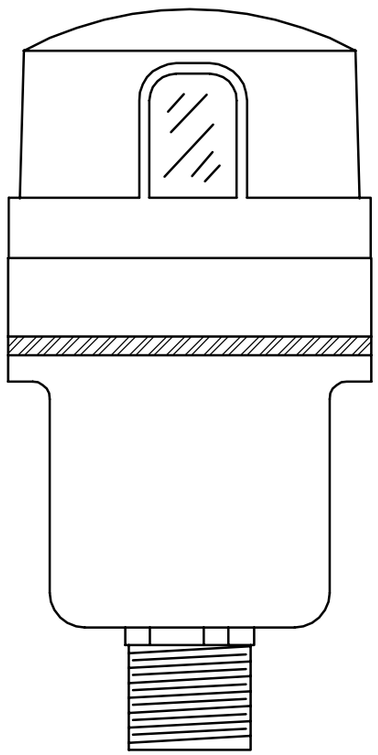
E-1DB INSTALLATION GUIDELINE

o2wireless Solutions
TWR lighting division

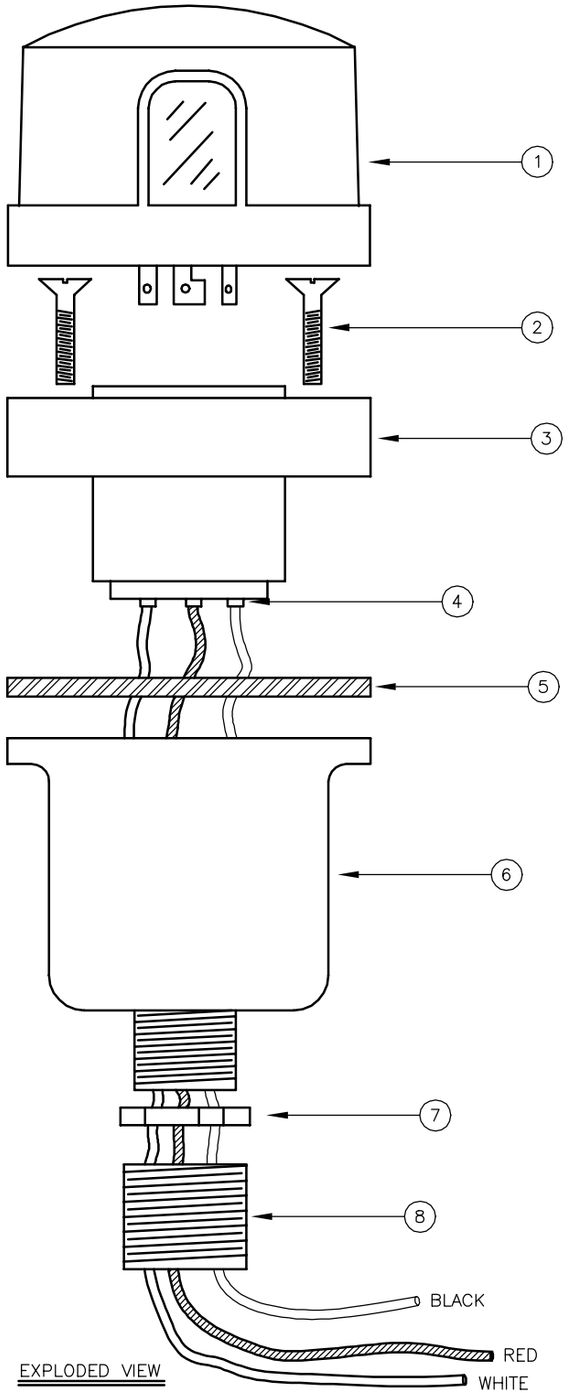
APP'D
CHK'D BY
ENGINEER

DRAWN BY E.A.SALAZAR
SHEET SIZE B
SHEET QTY. 1 OF 1
DATE 12/23/97
SCALE N.T.S.
DRAWING NO. INS-269

DATE:	LTR.	REVISION
8/13/98	A	G.D.S. ADDED MATERIALS



ASSEMBLY



EXPLODED VIEW

ITEM	QTY.	DESCRIPTION
1	1	PHOTOCELL
2	2	6-32 x 7/8" SCREW
3	1	RECEPTACLE SOCKET
4	3	.250 SPADE CONNECTOR
5	1	RECEPTACLE GASKET
6	1	RECEPTACLE HOUSING
7	1	1/2" CONDUIT LOCKNUT
8	1	3/4" TO 1/2" REDUCER

NOTES:

1. ITEM #8 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.

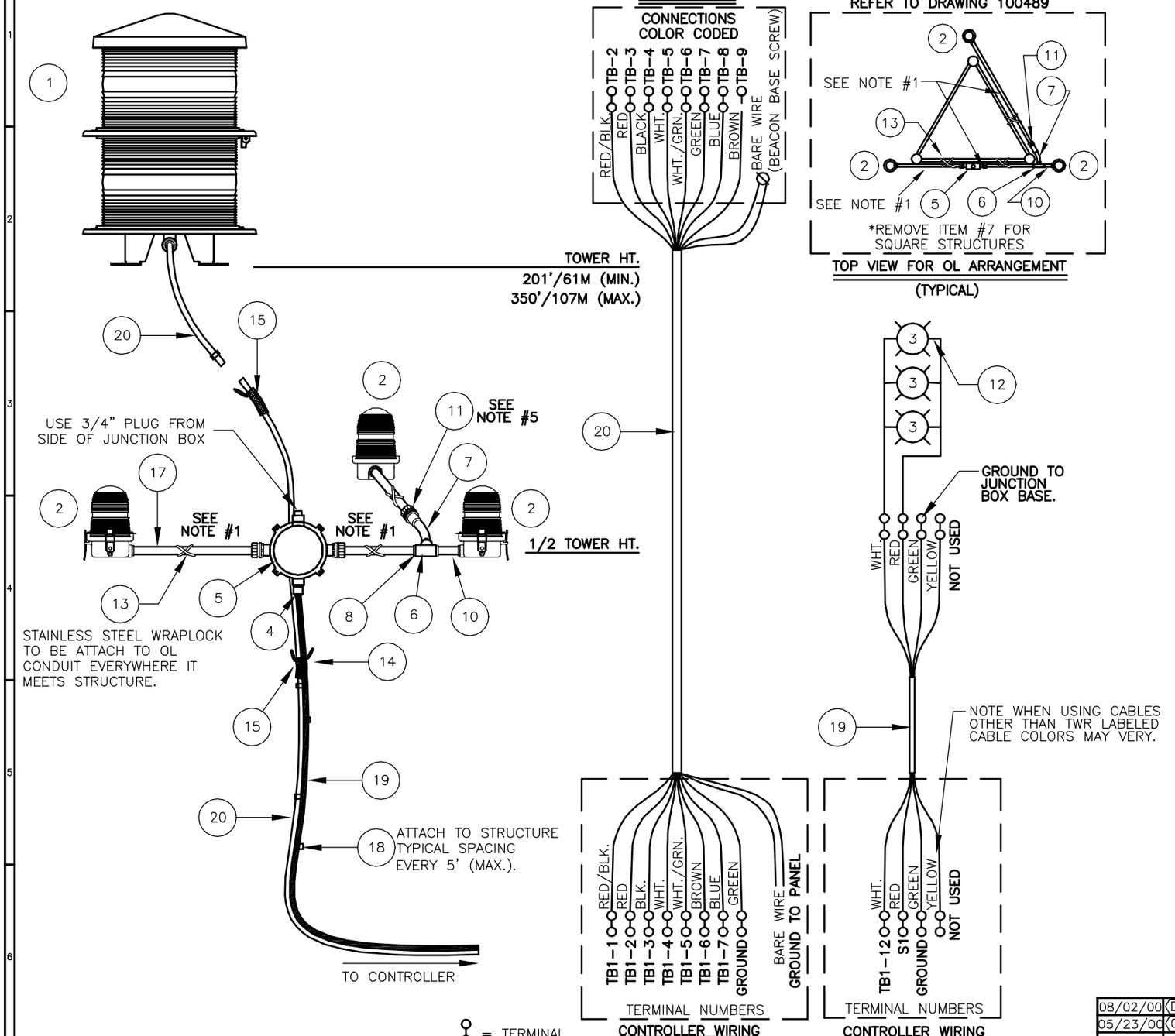
   21' TO 300' – 16 AWG TFFN
   301' TO 500' – 14 AWG TFFN

PHOTOCELL HOUSING DETAIL

o2wireless Solutions
TWR lighting division

APP'D
CHK'D BY
ENGINEER

DRAWN BY	SHEET SIZE	SHEET QTY.
E.A.SALAZAR	B	1 OF 1
DATE 10/18/95	SCALE N.T.S.	DRAWING NO. 100239



BILL OF MATERIALS

	ITEM NO.	QTY.	TWR PART NO.	DESCRIPTION
	1	1	STDBEACON	DUAL BEACON
	2	3	OL1	3/4" OBSTRUCTION LIGHT
*	3	3	116A21TS	116 WATT 120 VOLT LAMP
	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
*	9	1	PIPDOP	4 oz. PIPE DOPE
	10	1	N34T3	3/4" x 3" NIPPLE
	11	3	HC-402	3/4" NO THREAD CONNECTOR
	12	3	SLPIGTAIL25	25' SIDELIGHT PIGTAIL
	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
*	16	1	STH40269	SINGLE DUAL 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	–	STCABLTIE	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:

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

DATE:	LTR.	REVISION
08/02/00	(D)	CHANGED B.O.M.
05/23/00	(C)	CHANGED B.O.M.

LK1E1DB TOWER LIGHTING KIT CABLE RUN

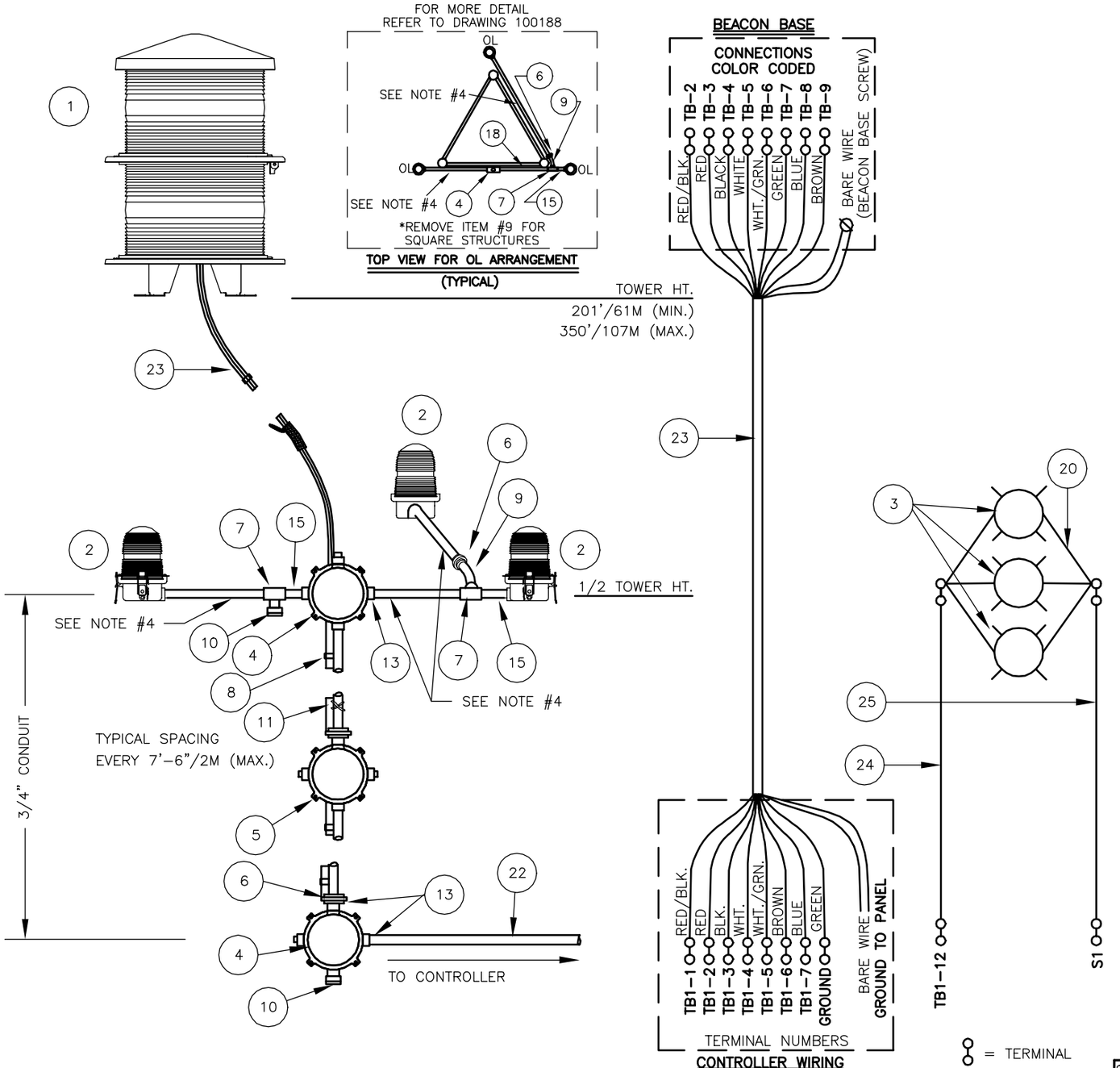
(TOWERS 201'/61M TO 350'/107M/10' FACE WIDTH MAX)

o2wireless Solutions
TWR lighting division

APP'D
CHK'D BY
ENGINEER

DRAWN BY E.A.SALAZAR | SHEET SIZE B | SHEET QTY. 1 OF 1

DATE 11/20/97 | SCALE N.T.S. | DRAWING NO. 600



BILL OF MATERIALS

	ITEM NO.	QTY.	TWR PART NO.	DESCRIPTION
	1	1	STDBEACON	DUAL BEACON
	2	3	OL1	3/4" OBSTRUCTION LIGHT
	3	3	116A21TS	116 WATT 120 VOLT LAMP
	4	2	JB5	3/4" JUNCTION BOX
	5	1	JBO	3/4" STRAIN RELIEF BOX
	6	4	UNY205	3/4" UNION
	7	3	T27CG	3/4" CONDULET W/COVER AND GASKET
	8	–	STCABLTIE	STROBE CABLE TIES (TOWER HEIGHT ÷ 5)
	9	1	EL3430	3/4" 30° ELBOW
	10	2	5012902	3/4" BREATHER
	11	1	SS10012	WRAPLOCK
*	12	1	PIPDOP	4 oz. PIPE DOPE
	13	12	A314	3/4" CONDUIT LOCKNUTS
*	14	8	CPLG34	3/4" GALVANIZED COUPLING
	15	4	N34T3	3/4" x 3" NIPPLE
	16	3	N34T6	3/4" x 6" NIPPLE
	17	3	N34T12	3/4" x 12" NIPPLE
	18	3	N34T24	3/4" x 24" NIPPLE
	19	2	N34T36	3/4" x 36" NIPPLE
	20	3	SLPIGTAIL25	25' SIDELIGHT PIGTAIL
*	21	1	STH40269	SINGLE DUAL BEACON CONTROLLER

ITEM NUMBERS #22–#25 ARE NOT INCLUDED IN THE KIT BUT ARE AVAILABLE UPON REQUEST, AND REQUIRED FOR INSTALLATION.

22	–	CONDUIT34	3/4" CONDUIT (1/2 TOWER HT. + 30'/9M)
23	–	STROBCABLE-3	STROBE CABLE
24	–	12THHNWHT	#12 THHN WHT. WIRE (1/2 TWR HT.+40'/12M)
25	–	12THHNRED	#12 THHN RED WIRE (1/2 TWR HT.+40'/12M)

* = ITEMS NOT SHOWN

NOTES:

1) CONDUIT SIZE BASED ON USING TYPE THHN WIRE.
2) USE RIGID GALVANIZED STEEL CONDUIT.
3) BREATHERS ALLOW FOR CIRCULATION OF AIR TO PREVENT CONDENSATION.
4) ITEMS #15–#19 TO BE USED IN VARIOUS COMBINATIONS FOR OL1 RUN. EXTRA NIPPLES TO BE CUT TO FIT IF FACE WIDTH IS LARGER THAN 6'.
5) USE ITEM #14 TO COUPLE CONDUIT NIPPLES. APPROPIATE OL1 EXTENSION FROM STRUCTURE IS 12".
6) MOUNT BEACON HINGE SO LENS WILL OPEN UNOBSTRUCTED BY STRUCTURE.
7) ON AM TOWER APPLICATIONS, KEEP GROUND LUG FROM BEING CONNECTED TO EARTH GROUND. GROUND TO THE TOWER ONLY.
8) THIS DRAWING IS PROVIDED AS A GENERAL REFERENCE. TWR LIGHTING, INC. DOCUMENTATION SUPERSEDES THIS DRAWING & SHOULD BE REVIEWED PRIOR TO INSTALLATION OF THIS SYSTEM.

LK2E1DB LIGHTING KIT W/ CONDUIT FOR 3 OL-1

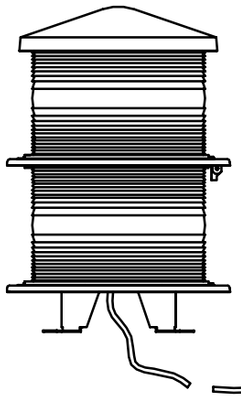
(TOWERS 201'/61M TO 350'/107M)

o2wireless Solutions
TWR lighting division

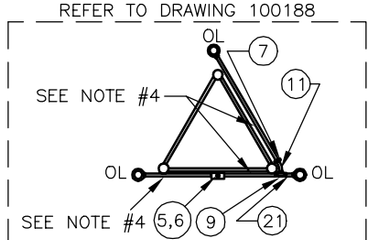
APP'D
CHK'D BY
ENGINEER

DRAWN BY E.A.SALAZAR
SHEET SIZE B
SHEET QTY. 1 OF 1
DATE 12/22/97
SCALE N.T.S.
DRAWING NO. 600-01

DATE:	LTR.	REVISION
08/02/00	(C)	CHANGED B.O.M.
01/13/00	(B)	CHG. WIRE CONNECTIONS



FOR MORE DETAIL
REFER TO DRAWING 100188

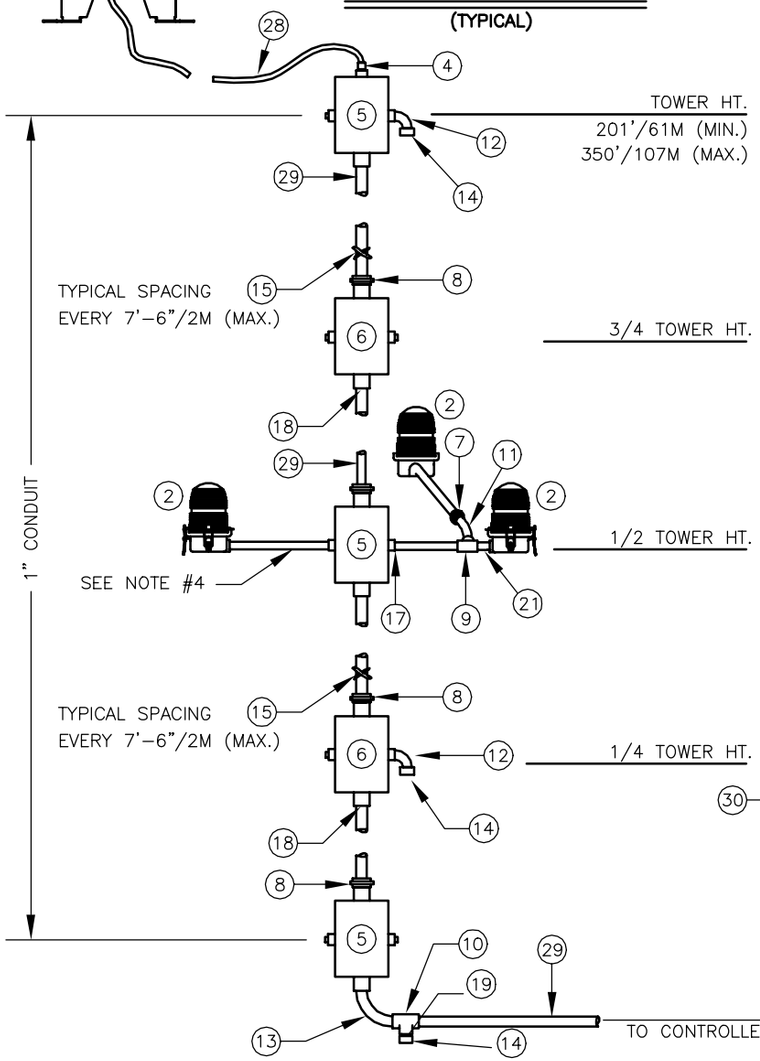


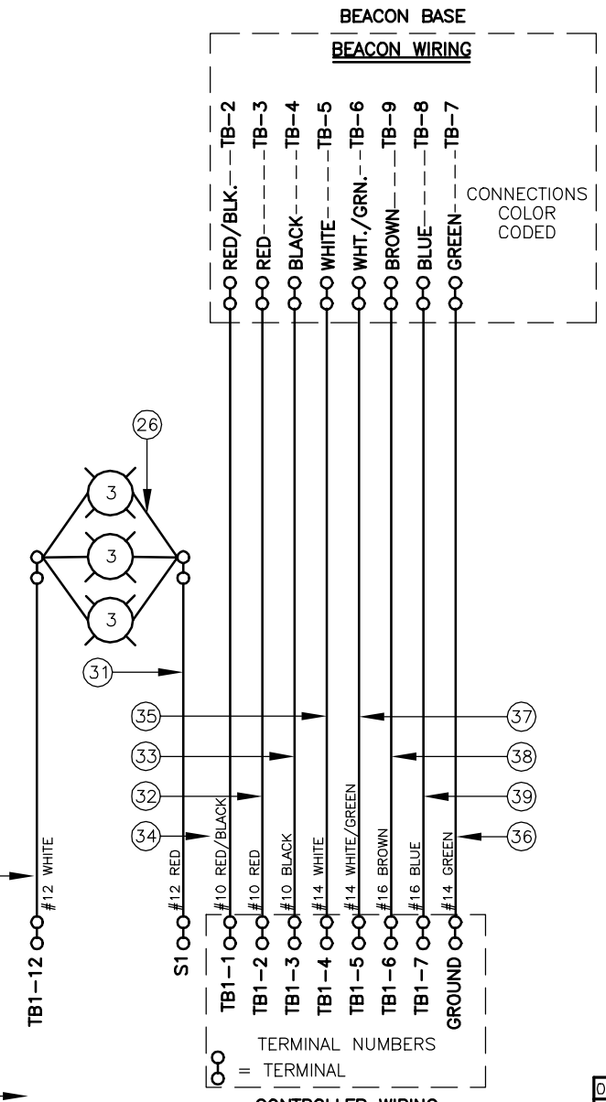
*REMOVE ITEM #11 FOR SQUARE STRUCTURES

TOP VIEW FOR OL ARRANGEMENT (TYPICAL)

NOTES:

1) CONDUIT SIZE BASED ON USING TYPE UL1452 WIRE.
2) USE RIGID GALVANIZED STEEL CONDUIT.
3) BREATHERS ALLOW FOR CIRCULATION OF AIR TO PREVENT CONDENSATION.
4) ITEMS #21–#25 TO BE USED IN VARIOUS COMBINATIONS FOR OL1 RUN. EXTRA NIPPLES TO BE CUT TO FIT IF FACE WIDTH IS LARGER THAN 6'.
5) USE ITEM #20 TO COUPLE CONDUIT NIPPLES. APPROPRIATE OL1 EXTENSION FROM STRUCTURE IS 12".





BILL OF MATERIALS

ITEM NO.	QTY.	TWR PART NO.	DESCRIPTION
1	1	STDBEACON	DUAL BEACON
2	3	OL1	3/4" OBSTRUCTION LIGHT
3	3	116A21TS	116 WATT 120 VOLT LAMP
4	1	CGB396SA	116 WATT 120 VOLT LAMP
5	3	JB8–2T	1" CORD CONNECT
6	2	JB8SR	1" STRAIN RELIEF BOX
7	1	UNY205	3/4" UNION
8	4	UNY305	1" UNION
9	1	T27CG	3/4" CONDULET W/COVER AND GASKET
10	2	T37CG	1" CONDULET W/COVER AND GASKET
11	1	EL3430	3/4" 30° ELBOW
12	2	EL3490	3/4" 90° SHORT ELBOW
13	2	EL190	1" 90° SWEEP ELBOW
14	3	5012902	3/4" BREATHER
15	1	SS10012	WRAPLOCK
* 16	1	PIPDOP	4 oz. PIPE DOPE
17	5	A314	3/4" CONDUIT LOCKNUTS
18	12	A315	1" CONDUIT LOCKNUTS
19	2	RE32	1" TO 3/4" REDUCER
* 20	8	CPLG34	3/4" GALVANIZED COUPLING
21	4	N34T3	3/4" x 3" NIPPLE
22	3	N34T6	3/4" x 6" NIPPLE
23	3	N34T12	3/4" x 12" NIPPLE
24	3	N34T24	3/4" x 24" NIPPLE
25	2	N34T36	3/4" x 36" NIPPLE
26	3	SLPIGTAIL25	25' SIDELIGHT PIGTAIL
* 27	1	STH40269	SINGLE DUAL BEACON CONTROLLER
28	10'	STROBCABLE–3	STROBE CABLE

ITEM NUMBERS #29–#39 ARE NOT INCLUDED IN THE KIT BUT ARE AVAILABLE UPON REQUEST, AND REQUIRED FOR INSTALLATION.

29	–	CONDUIT1	1" CONDUIT (TOWER HT. + 30'/9M)
30	–	12UL1452WHT	#12 UL1452 WHT. WIRE(1/2TWR HT.+40'/12M)
31	–	12UL1452RED	#12 UL1452 RED WIRE(1/2TWR HT.+40'/12M)
32	–	10UL1452RED	#10 UL1452 RED WIRE (TWR HT. + 40'/12M)
33	–	10UL1452BLK	#10 UL1452 BLK. WIRE (TWR HT. + 40'/12M)
34	–	10UL1452REDBLK	#10 UL1452 RED/BLK. WIRE(TWR HT+40'/12M)
35	–	14UL1452WHT	#14 UL1452 WHT. WIRE (TWR HT. + 40'/12M)
36	–	14UL1452GRN	#14 UL1452 GREEN WIRE(TWR HT + 40'/12M)
37	–	14UL1452WHTGRN	#14 UL1452 WHT/GRN WIRE(TWR HT.+40'/12M)
38	–	16UL1452BRN	#16 UL1452 BROWN WIRE(TWR HT+40'/12M)
39	–	16UL1452BLUE	#16 UL1452 BLUE WIRE (TWR HT. + 40'/12M)

* = ITEMS NOT SHOWN

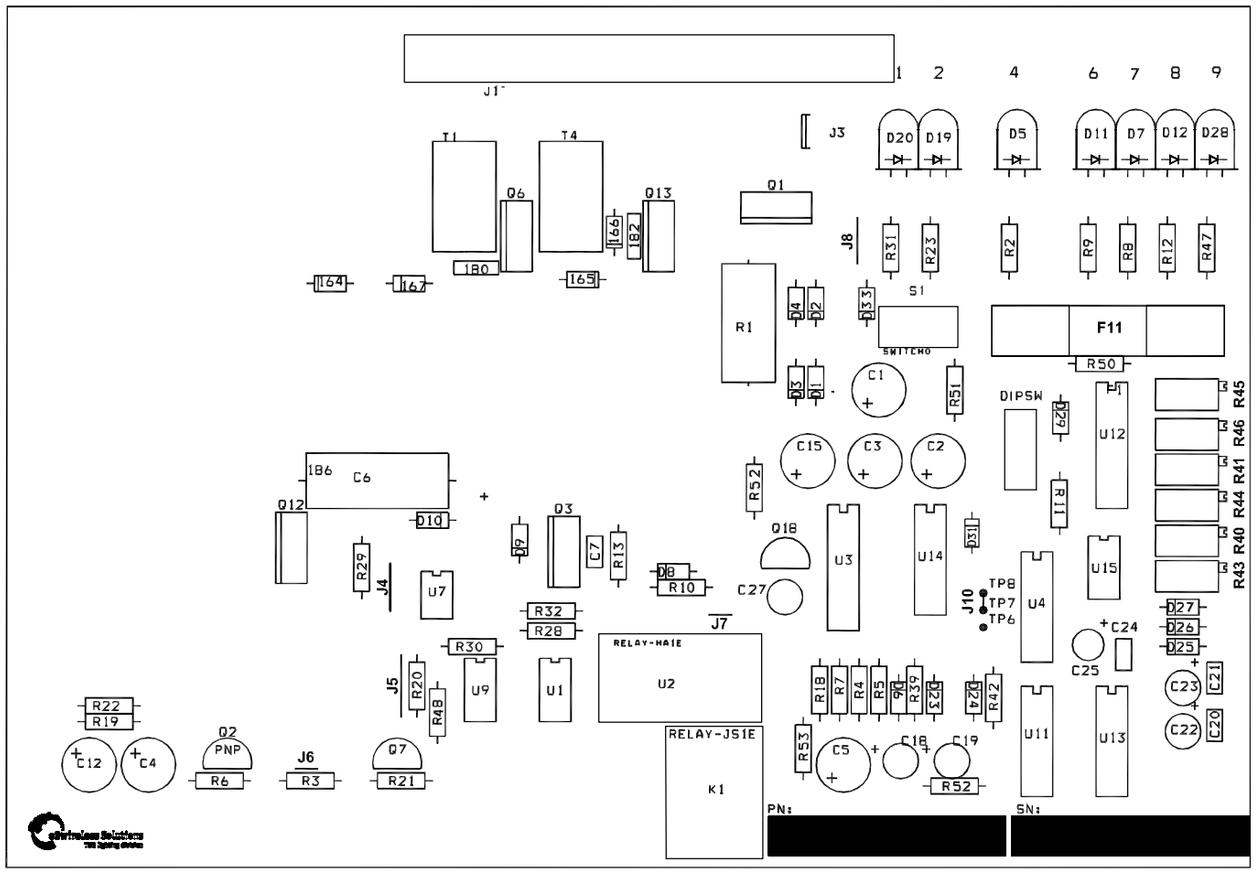
DATE:	LTR.	REVISION
08/02/00	(C)	CHANGED B.O.M.
01/13/2000	(B)	CHG. WIRE CONNECTIONS

LK3E1DB TOWER LIGHTING KIT W/3 OL–1
(TOWERS 201'/61M TO 350'/107M)

o2wireless Solutions
TWR lighting division

APP'D
CHK'D BY
ENGINEER

DRAWN BY E.A.SALAZAR
SHEET SIZE B
SHEET QTY. 1 OF 1
DATE 12/22/97
SCALE N.T.S.
DRAWING NO. 600–02



FACTORY SETUP:

MASTER & STAND ALONE

	OFF	ON
1		ON
2	OFF	
3		ON
4	OFF	
5		ON

DIPSW

OPTIONAL SETUP:

SLAVE

	OFF	ON
1	OFF	
2		ON
3	OFF	
4	OFF	
5	OFF	

DIPSW

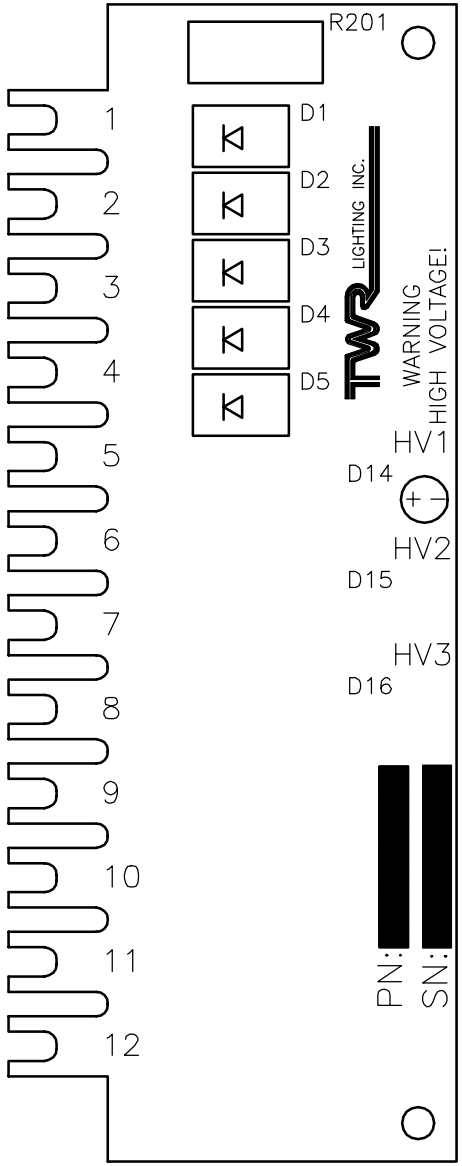
E-1DB CONTROL PCB

o2wireless Solutions
TWR lighting division

APP'D
CHK'D BY
ENGINEER

DRAWN BY E.A.SALAZAR
SHEET SIZE B
SHEET QTY. 1 OF 1
DATE 12/01/97
SCALE N.T.S.
DRAWING NO. H01-269

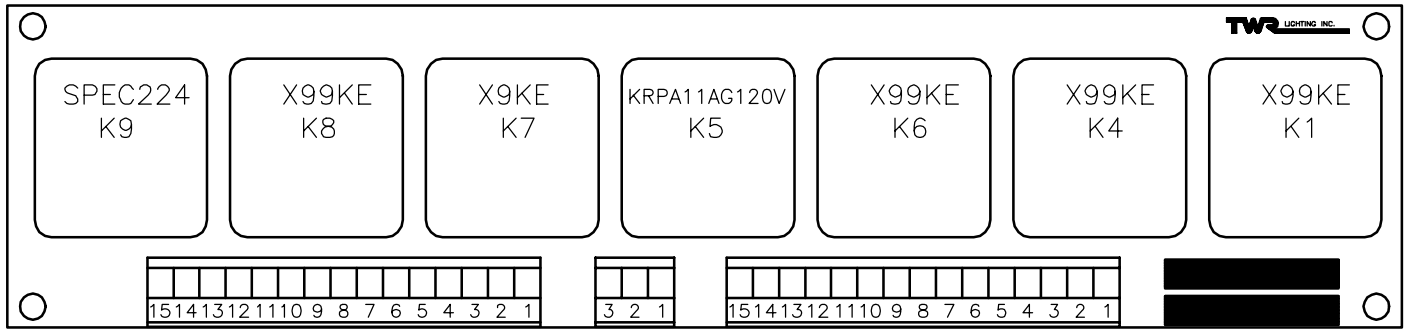
DATE:	LTR.	REVISION
01/09/01	B	MODIFIED PCB



D-1LV,D-1LVS,E-1DB HIGH VOLTAGE RECTIFIER PCB

o2wireless Solutions
TWR lighting division

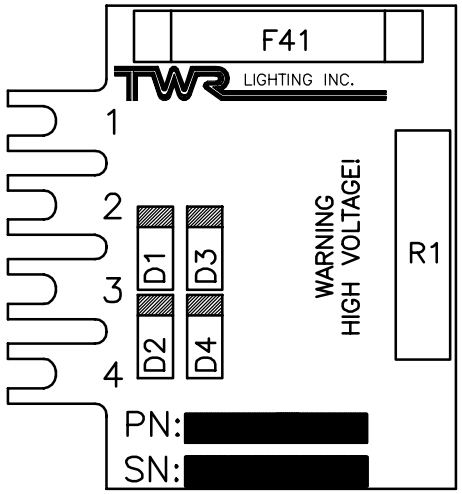
APP'D	
CHK'D BY	
ENGINEER	
DRAWN BY	E.A.SALAZAR
SHEET SIZE	B
SHEET QTY.	1 OF 1
DATE	11/07/98
SCALE	FULL
DRAWING NO.	H02-226A



E-1 DB RELAY PCB
(PCB3)

o2wireless Solutions
TWR lighting division

APP'D	
CHK'D BY	
ENGINEER	
DRAWN BY: E.A.SALAZAR	SHEET SIZE: B / SHEET QTY.: 1 OF 1
DATE: 06/14/97 / SCALE: N.T.S.	DRAWING NO.: H03-269



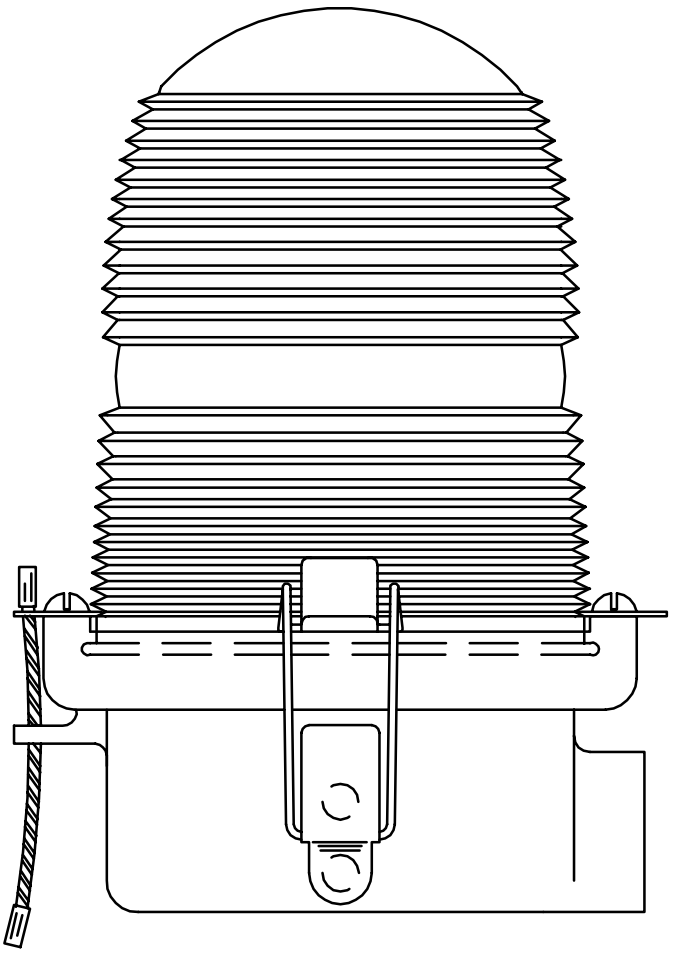
E-1DB/E-2/3DB TRIGGER VOLTAGE
RECTIFIER PCB (PCB4)

o2wireless Solutions
TWR lighting division

APP'D	
CHK'D BY	
ENGINEER	
DRAWN BY: E.A.SALAZAR	SHEET SIZE: B / SHEET QTY.: 1 OF 1
DATE: 06/13/97 / SCALE: FULL	DRAWING NO.: H04-269

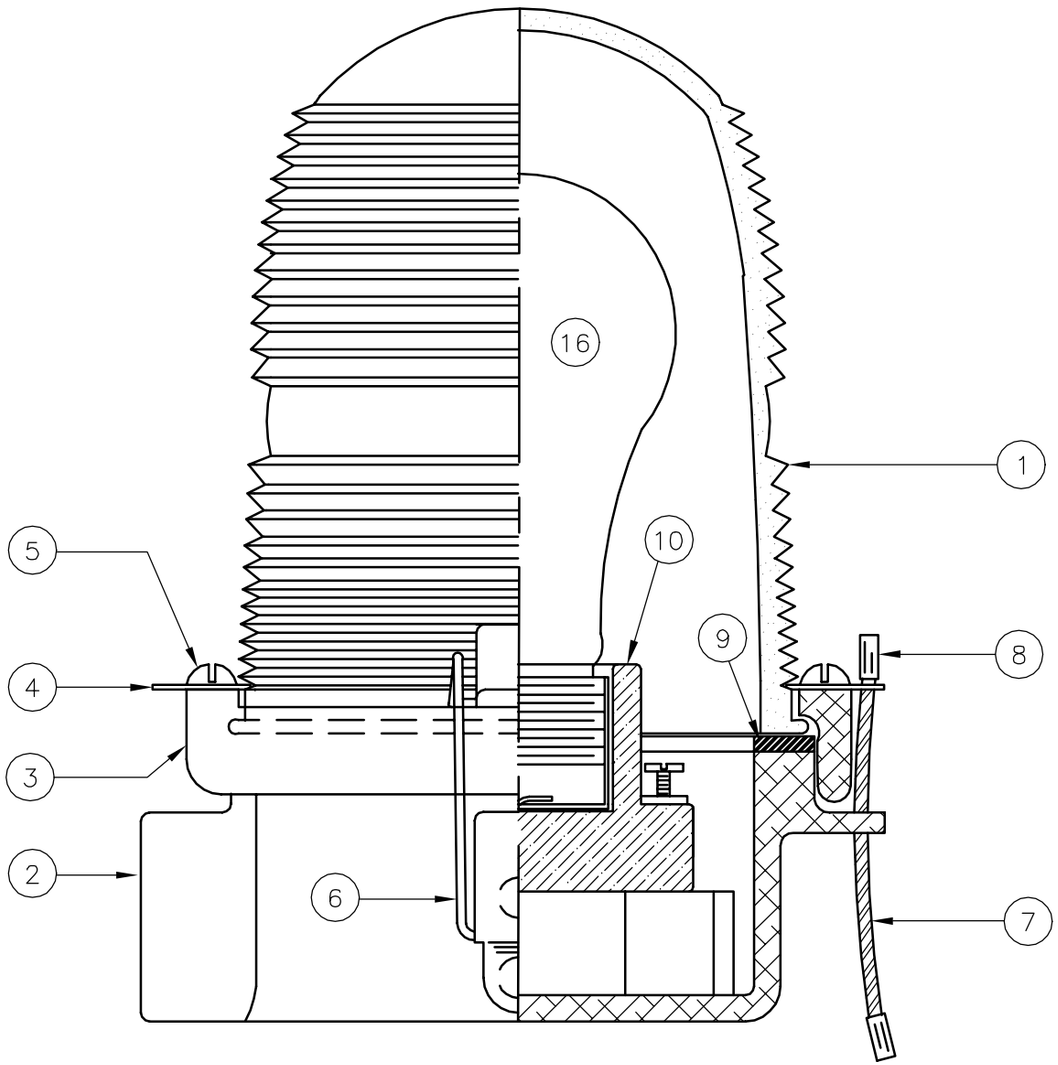
o2wireless Solutions
TWR lighting division
1603 ELMVIEW DRIVE
HOUSTON,TEXAS 77080-7223
FAX: (713) 973-6652
PHN: (713) 973-6905

FAA SPEC. L-810 RED TYPE OL-1 SINGLE OBSTRUCTION LIGHT



- 7" HIGH
- 4-1/2" DIAMETER
- WEIGHT 4 LBS.
- 3/4" HORIZONTAL CONDUIT ENTRANCE ON SIDE. BOTTOM HUB ALSO AVAILABLE.
- USE ONE LAMP 116 A21/TS 120/230 VOLT 8000 HOUR LIFE.
- LAMP HOLDER IS PORCELAIN WITH BRASS SCREW SHELL.

[100031]



	ITEM NO	QTY.	TWR PART NUMBER	DESCRIPTION
	1	1	AP35222	RED SIDELIGHT GLASS
	2	1	105R	OL-1 BOTTOM HUB
	3	1	106C	LENS HOLDER RING
	4	2	12V245	OL LENS CLIP
	5	2	832X14PH	8-32 X 1/4" PH S.S. SLOT
	6	2	HC255SS	SIDELIGHT LATCHES
	7	1	7X7SS	1/16 7 X 7 S.S. WIRE
	8	2	A1A	STAKON CRIMP
	9	1	OLG	OL GASKET
	10	1	19062	SIDELIGHT RECEPTACLE
*	11	4	18PRSS	1/8 POP RIVETS
*	12	1	A314	3/4" CONDUIT LOCKNUT
*	13	2	104G	WHITE TEFLON WASHER
*	14	2	832X34PH	8-32 X 3/4" S.S. RH SLOT
*	15	1	100327	OL-1 SERIAL NUMBER LABEL
~	16	1	116A21TS	116W-120V LAMP (TYP.)

*=PART NOT SHOWN
~=PART SOLD SEPARATELY

NOTE:
1. FAA APPROVED LIGHT USES THE 116A21TS LAMP. OTHER LAMPS ARE AVAILABLE TO MEET YOUR APPLICATION.

OL1

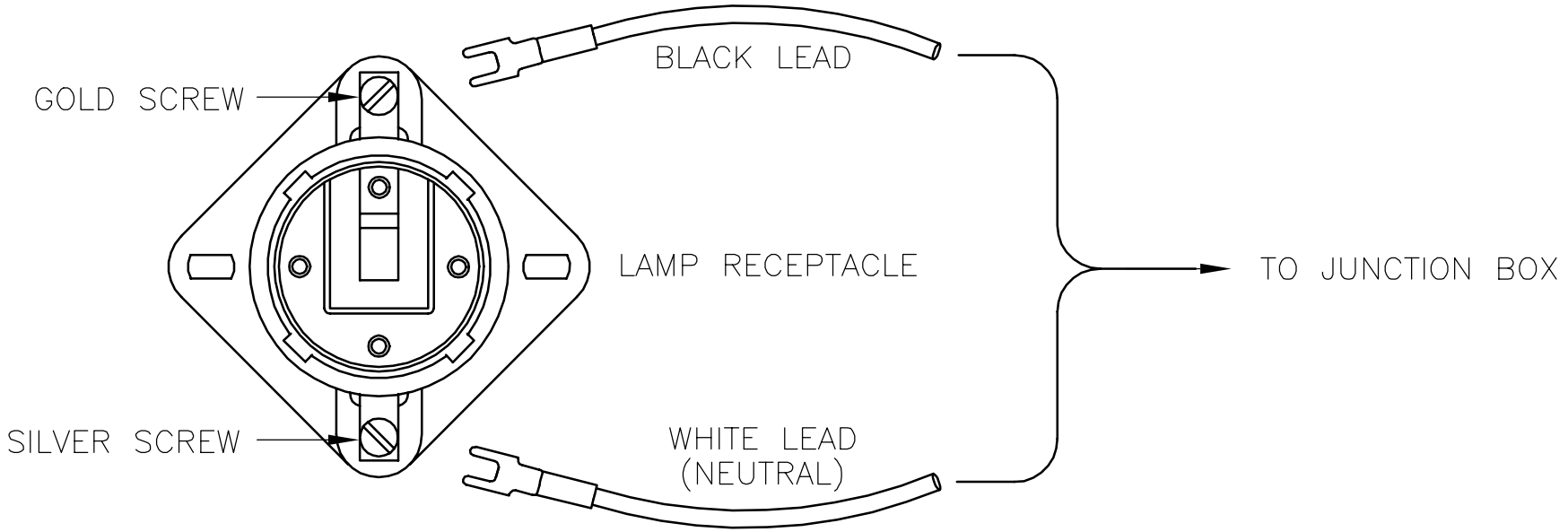
3/4" OL-1 SIDE HUB ASSEMBLY DETAIL (PART #OL1)

o2wireless Solutions
TWR lighting division

APP'D
CHK'D BY
ENGINEER

DRAWN BY E.A.SALAZAR
SHEET SIZE B
SHEET QTY. 1 OF 1
DATE 1/7/92
SCALE FULL
DRAWING NO. 279-OL

DATE:	LTR.	REVISION
06/23/97	A	UPDATED B.O.M.

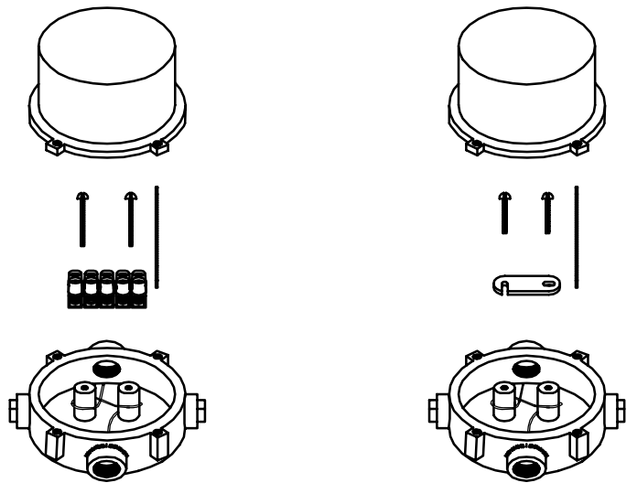


SIDELIGHT RECEPTACLE WIRING

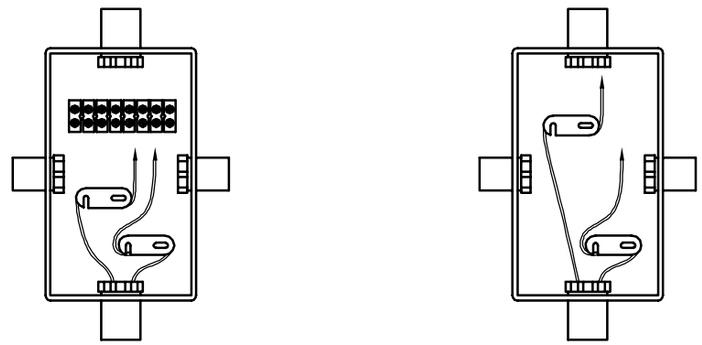
o2wireless Solutions
TWR lighting division

APP'D	
CHK'D BY	
ENGINEER	
DRAWN BY	G.D.SEBEK
SHEET SIZE	B
SHEET QTY.	1 OF 1
DATE	6/8/91
SCALE	1"=1"
DRAWING NO.	274 S

DATE:	LTR.		REVISION
7/2/98	A	G.D.S.	CHANGED LABEL



JB–5 AND JB–0
3/4" JUNCTION BOX



JB–8 AND JB–8SR
1" JUNCTION BOX

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

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.

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

JUNCTION AND STRAIN RELIEF BOXES

o2wireless Solutions
TWR lighting division

APP'D	
CHK'D BY	
ENGINEER	
DRAWN BY	G.D.SEBEK
SHEET SIZE	B
SHEET QTY.	1 OF 1
DATE	7/26/93
SCALE	N.T.S.
DRAWING NO.	100089