TWR Lighting, Inc.

4300 WINDFERN RD. #100 HOUSTON TX 77041-8943
VOICE (713) 973-6905 FAX (713) 973-9352
WEB: twrlighting.com

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-HK

SERIAL # _____

PURCHASE DATE _____

PURCHASED FROM _____

C:\Documents and Settings\esalazar\Local Settings\Temporary Internet Files\OLK2\E-1DB-HK.doc
04-1999, Rev. 07-16-99, Rev. 01-13-00, Rev. 02-23-00
Rev. 06-09-00, Rev. 08-23-00 (Dwgs. H40-269 & M01-269)
Rev. 10-16-2000 retyped

L-864/L865 CONTROLLER
MODEL E-1DB-HK

TABLE OF CONTENTS

L-864/L865 CONTROLLER
MODEL E-1DB-HK

APPENDIX

L-864/L865 CONTROLLER
MODEL E-1DB-HK

1.0 INTRODUCTION

TWR Lighting Division Model E-1DB-HK 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-HK 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:	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	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:	+55°C / -55°C
Beacon Wind Load:	2.1 ft^2

2.0 INSTALLATION

WARNING DANGER!!!

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.

WARNING DANGER!!!

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!!

2.5.1 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.

2.5.1.3 Slip the electrical cable for the dual beacon 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 Black		20 Gauge Black	4
10 Gauge Red/Black		12 Gauge Red	2
10 Gauge Red		12 Gauge Red	3
14 Gauge White		20 Gauge White	5
14 Gauge White/Green		20 Gauge White/Green	6
14 Gauge Green		20 Gauge Green	7
16 Gauge Blue		20 Gauge Blue	8
16 Gauge Brown		20 Gauge Brown	9
16 Gauge Bare Wire		Beacon Base	

2.5.2 Lighting Kit Wiring

Install wiring between the controller to the beacon utilizing either strobe cable or conduit method. **(TWR LIGHTING CANNOT WARRANTY SYSTEMS THAT EMPLOY SPLICING CABLE.)** 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.

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 900V AC. These outputs are sent to the high voltage rectifier PCB (PCB #2) and converts the 900V AC 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.

****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.

3.7 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, and 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) 5/32 Allen Wrench
1) Needle Nose Pliers
1) Precision Flat Screw Driver
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, H01-269, and H01-269HK.)

NOTE: There could be either an analog or a digital control board installed as PCB #1. The analog control board is shown in drawing H01-269, and the digital control board is shown in drawing H01-269HK. Prior to troubleshooting, verify that the test switch is in the normal position. On the analog board, this switch is labeled SWITCHS1, and the normal position is downward. On the digital board, this switch is labeled SW001, and the normal position is towards the back of the back of the cabinet.

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 LED4 - Out

4.3.2.1 Verify that proper power is available to the controller cabinet.

4.3.2.2 Check interlock circuit for an open circuit. If open, make the necessary repairs. For both analog and digital control boards (PCB #1), if okay, check fuse F2 in the cabinet. Replace if bad. For both control boards, check the board mounted fuse. Replace if bad with the same type fuse. If the control board mounted fuse blows again, replace the control board (PCB #1).

4.3.3 DC Power on LED6 - Out

4.3.3. Check for presence of 20V AC across JP001, terminals 13 and 14. Repair as necessary if any problems are found.

4.3.4 Primary Timing LED – Out

4.3.4.1 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.

4.3.5 False or Nonexistent Beacon Alarms (SF)

4.3.5.1 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.

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

4.3.5.3 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 can be tested by placing the control board (PCB #1) test switch to on. On the analog board, this position is upward. On the digital board, this position is towards the front of the cabinet. After testing, return the test switch to the normal position. On the analog board, this is downward, and on the digital board, this is towards the back of the cabinet.

4.3.6 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.

4.3.7 No Red Strobe Operation

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

4.3.7.2 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.***

4.3.8 Additional Troubleshooting Guide (for the Digital Control Board ONLY)

If the unit passes all tests listed above, but the strobes still do not flash, the following LEDs should be lit on the H01-269HK digital control board:

D401: (near center of PCB); indicates trigger voltage present. If this LED is not lit, check for presence of trigger voltage (230- 260V DC at JP001-11.

(**NOTE**: this LED will dim momentarily whenever the strobe is triggered successfully). If trigger voltage is low or not present, the trigger indicates voltage problem lies elsewhere within the E-1DB-HK. Repair as necessary. If trigger voltage is present at the test point, but D401 is not lit, replace the H01-269HK.

1) **LED #1** should not be lit if the strobes are not firing. If this LED is lit while the strobes are not firing, replace the H01-269HK.
2) **LED #2** will be lit only if the E-1DB-HK has been in nightmode at least once since failure occurred.
3) **LED #4** indicates presence of 120V AC. If this LED is not lit, and proper voltage is available to the cabinet, replace the H01-269HK.
4) **LED #6** indicates that the H01-269HK's CPU has verified the presence of trigger voltage. If this LED is not lit, replace the H01-269HK.
5) **LED #7** indicates that the E-1DB-HK is in nightmode. May or may not be lit.
6) **LED #8** indicates timing of trigger pulses. This LED should not be lit constantly, but should flash briefly. The LED should stay on for a longer period of time if the E-1DB-HK is in nightmode. If this LED is unlit or always lit, replace the H01-269HK. Note that this LED is not very bright during the "on" portion of its flash cycle.

Problem:
Red strobe only operates for a few flash cycles before going into failed mode. (Red strobe operation verified visually). Red lamp energy reading at or near zero. System has logged "Red Strobe Failure" alarms.

OR

White strobe operates property (verified visually), but white lamp energy is at or near zero. System has logged "All Lights Out."

Solution:
This indicates that there is a problem with the pulse detector circuitry or the controller's CPU. Replace the H01-269HK.

Problem:
Capacitor bank voltage reads low when dialing into the H01-269HK, but strobes are flashing properly.

Solution:
Carefully verify that the capacitor banks are being charged to the proper voltage. Verify that the connections between the capacitor bank and the H01-269HK (red/black wire from TB2-4 to JP003-1) are secure. Repair if

necessary. If capacitor voltage and wiring connections are found to be satisfactory, replace the H01-269HK.

Problem:
E-1DB-HK does not switch from day to nightmode or vice versa.

Solution:
1. Check the wiring between the photocell and TB1. Repair if necessary.

2. Check the wiring between TB1 and the H01-269HK (brown wire from TB1-8 to JP003-5, red wire from TB1-9 to JP003-3, and white wire from TB1-10 to JP003-4). Repair if necessary.

3. Check the wiring from P2-5 to JP003-6 (violet). Repair if necessary.

4. Check photocell operation: cover or illuminate photocell to switch modes. Measure the AC voltage from TB1-9 to ground. When the photocell is registering daylight, 0V AC should be present. When in nightmode, 120V AC should be present. (**NOTE**: allow a few seconds for the photocell to switch modes). If either of these measurements fail, check the wiring between TB1-8, TB1-9, and the other E-1DB-HK circuitry. If this wiring is also found to be satisfactory, replace the photocell.

If all wiring appears in good condition and photocell unit is in proper working order, check the voltage at JP003-6 with respect to ground. In nightmode, there should be 120V AC present. In daymode, there should be nearly 0V AC present. Force the photocell to switch modes (or use photocell bypass SW1). If the voltage reading at JP003-6 does not change, replace the H01-269HK. If the voltage reading changes, but the E-1DB-HK does not change modes, check K4, and its associated circuitry. Repair as necessary.

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 SHOULD 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 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 necessary.

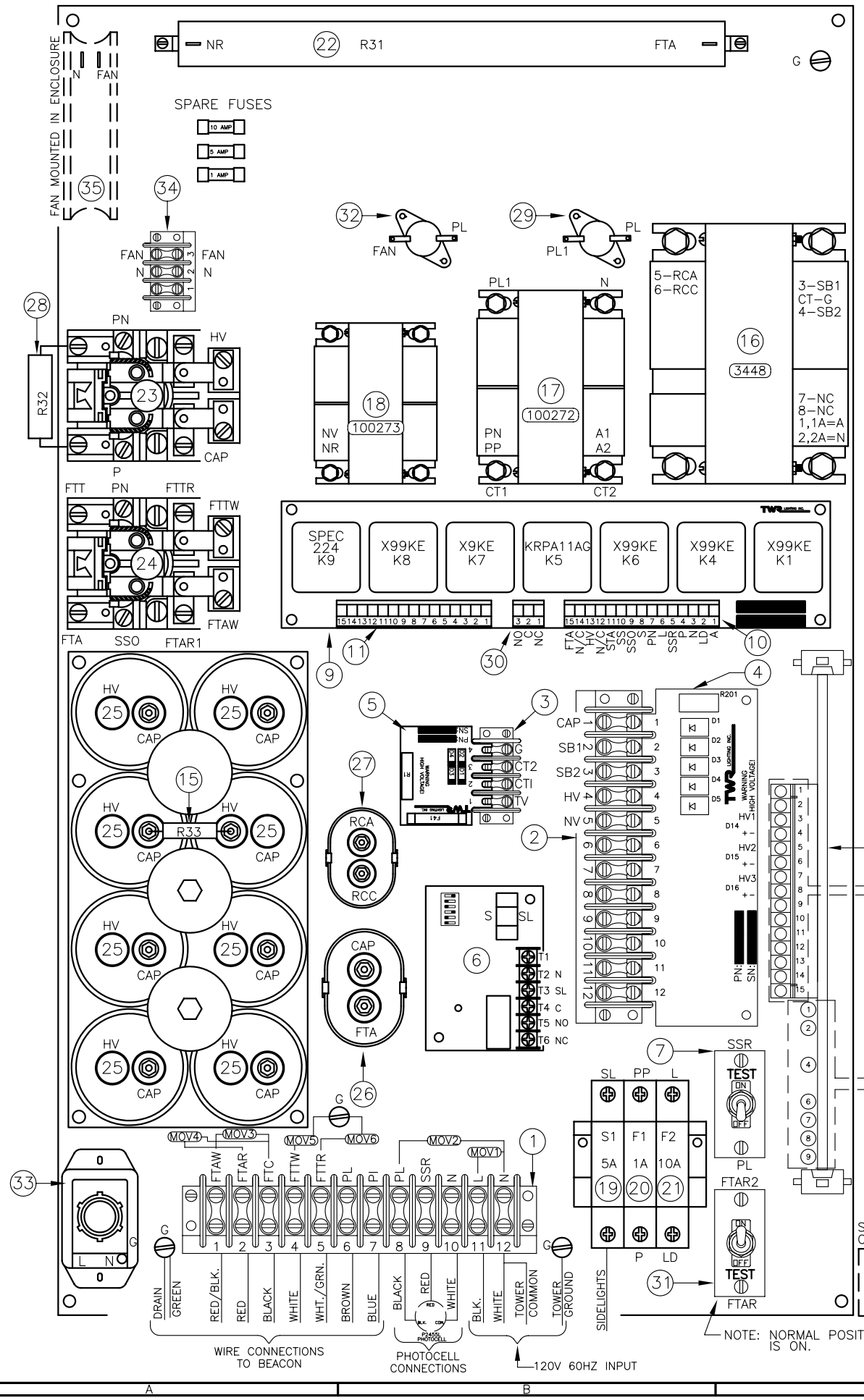
6.0 MAJOR COMPONENTS LIST

SCHEMATIC TAG #	DESCRIPTION	PART NUMBER
BSS1	BEACON SAFETY SWITCH	STJ02003
C101	4 uF 660V AC CAP	STB99005
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	FNQ10
F11	1/2 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	SCR430T
MOVMOD1	SURGE SUPPRESSOR	DTK-120HW
MOV3, MOV4	METAL OXIDE VARISTOR	V1000LA80A
P1, P2, P3	15 POSITION PLUG	PLUG
PCB1	E-1DB-HK CONTROL PCB	STH01269HK
MOV5, MOV6	METAL OXIDE VARISTOR	V275LA20A
PCB2	HIGH VOLTAGE RECTIFIER PCB	STH02226A

SCHEMATIC TAG #	DESCRIPTION	PART NUMBER
PCB3	RELAY PCB	STH03269
PCB 4	TRIGGER VOLTAGE RECTIFIER PCB	STH04269
PHOTOCELL	120V AC PHOTOCELL	P2455L
R31	50 ohm 225W	STA22004
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 PART 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
	FLASHTUBE SOCKET	100319
	HINGE GASKET	STBEAGSKT
	LENS GASKET	STBEAGSKT2
	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	FNQ10	10 amp FUSE
2	KTK5	5 amp FUSE
2	FUSE.5	2 amp FUSE
2	FUSE.125	1/8 amp FUSE
1	STH01-269HK	E-1DB-HK PCB #1
1	P2455L	120V AC PHOTOCELL
1	STJ10006	HV BLEEDER RELAY
1	STJ02003	BEACON SAFETY SWITCH
1	STJ02001	CABINET SAFETY SWITCH
1	STFLSHTB6	DAYMODE FLASH TUBE
1	STFLSHTB7	NIGHTMODE FLASH TUBE
2	X99KE	DPDT OCTAL RELAY
1	KRPA11AG120	DPDT OCTAL RELAY
1	SCR430T	CURRENT SENSOR
1	DTK-120HW	SURGE SUPPRESSOR



CUSTOMER STROBE ALARM POINTS

*J3 CUSTOMER ALARMS

11

1	NO	SA	(SIDELIGHT ALARM)
2	COM		
3	NC		
4	OPEN	SF	(WHITE STROBE FAILURE)
5	COM		
6	CLOSED		
7	OFF	PC	(PHOTOCELL)
8	COM		
9	ON		
10	OPEN	RF	(RED STROBE FAILURE)
11	COM		
12	CLOSED		
13	CLOSED	PF	(POWER FAILURE)
14	COM		
15	OPEN		

*CONTACT POINTS SHOWN IN NORMAL OPERATION.

J2 ALARM INTERCONNECT

30

1	NC
2	C
3	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 2.5KVDC
27	C101	RESONANT CAPACITOR 4uf 660VAC
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.

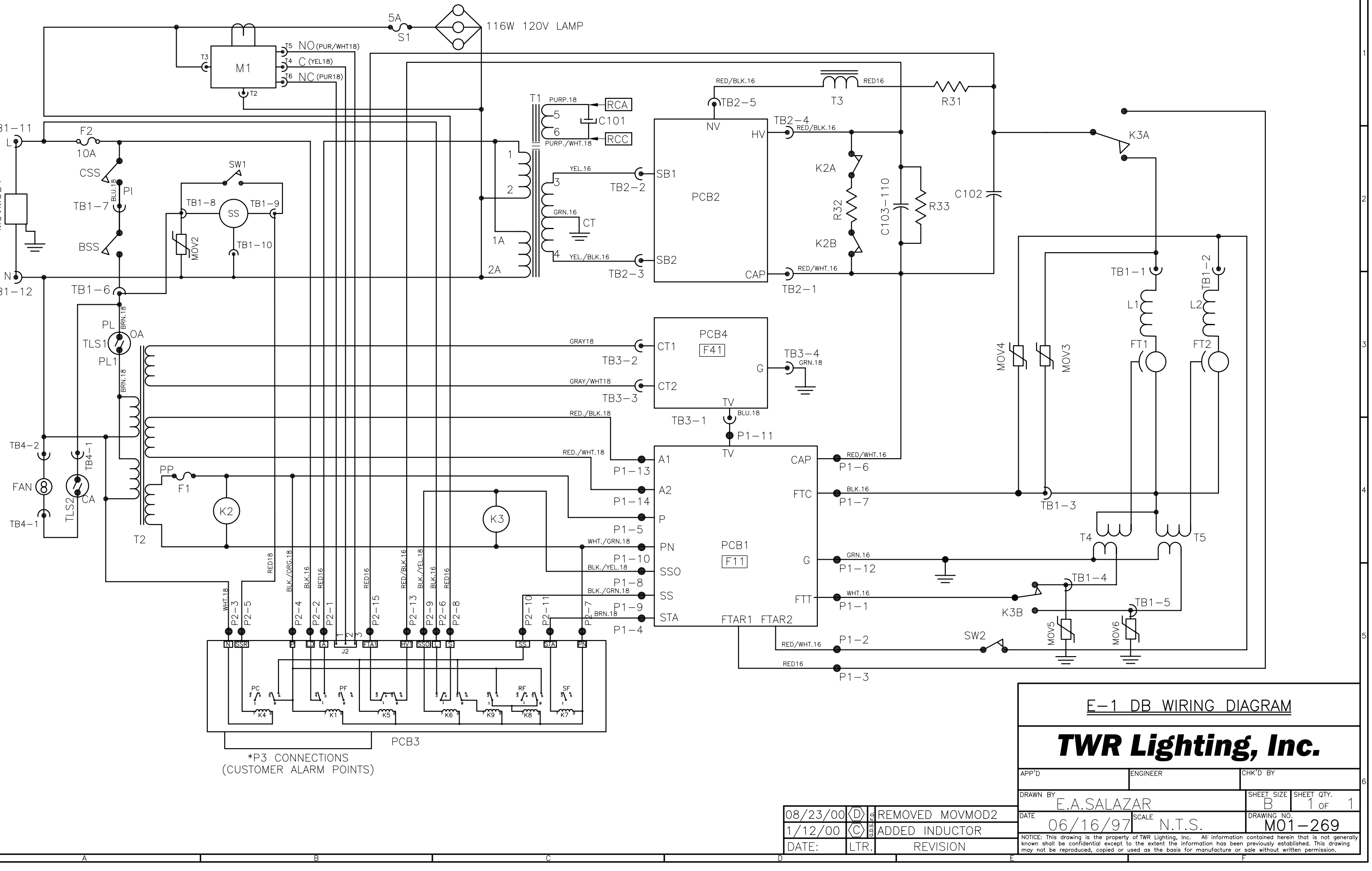
E-1DB CHASSIS LAYOUT

L-864/L-865 DUAL CONTROLLER 120VAC

TWR Lighting, Inc.

APP'D	ENGINEER	CHK'D BY	
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	

DATE:	LTR.	REVISION
09/27/01	(E)	CHGD. uf ON ITEM#27



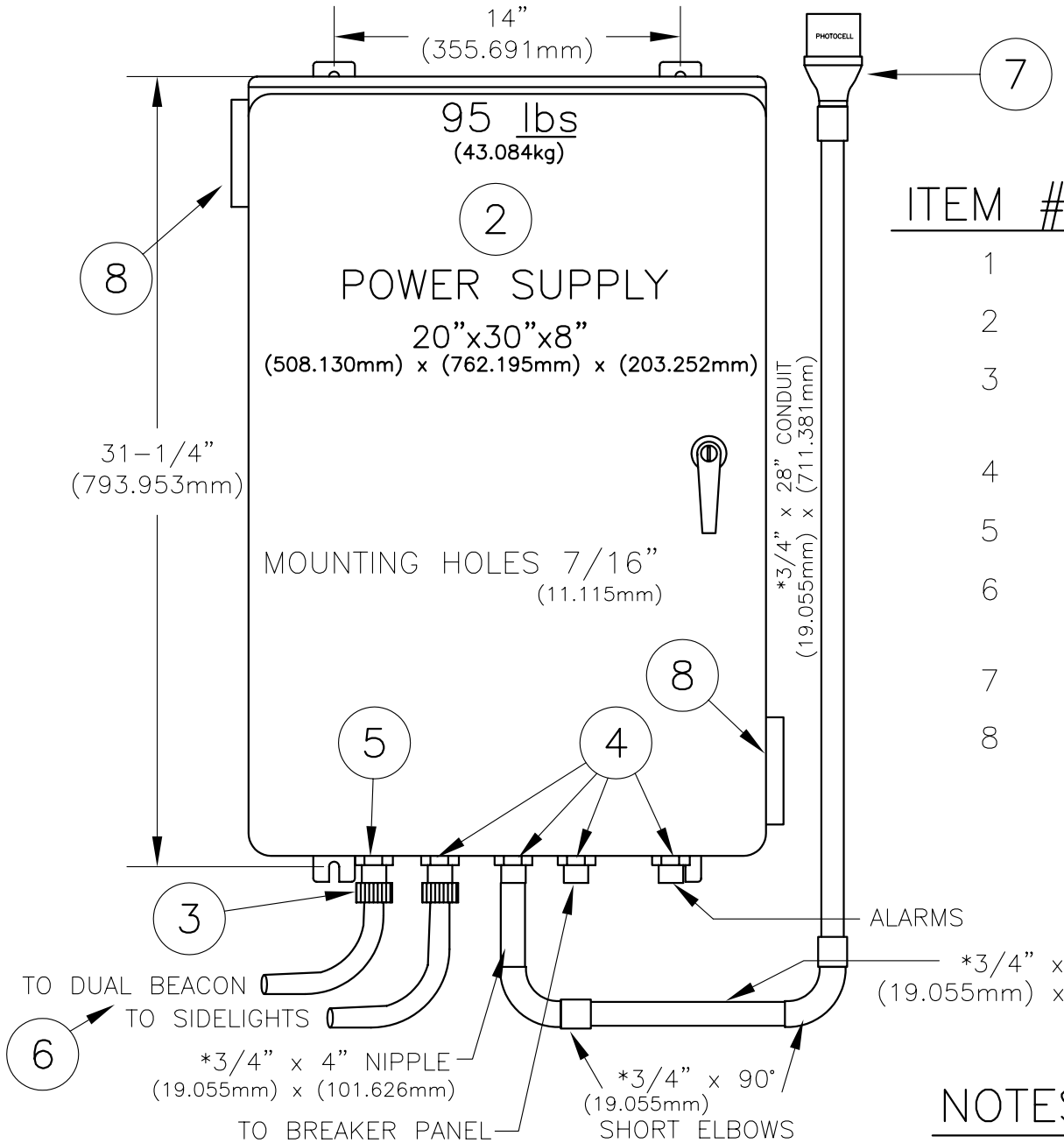
E–1 DB WIRING DIAGRAM

TWR Lighting, Inc.

APP'D	ENGINEER	CHK'D BY
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

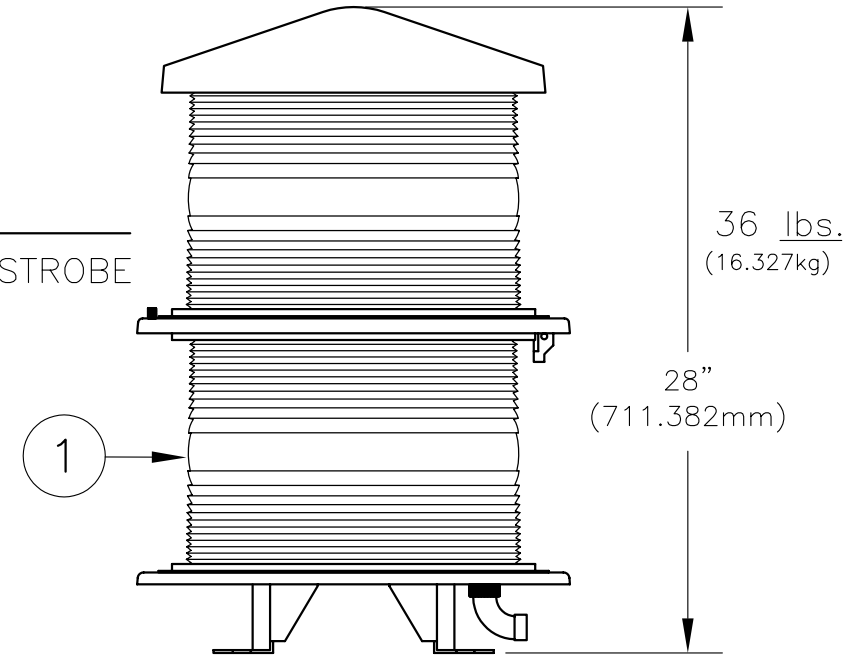
DATE	LTR.	REVISION
08/23/00	D	REMOVED MOVMOD2
1/12/00	C	ADDED INDUCTOR

G.D.S.F.D.

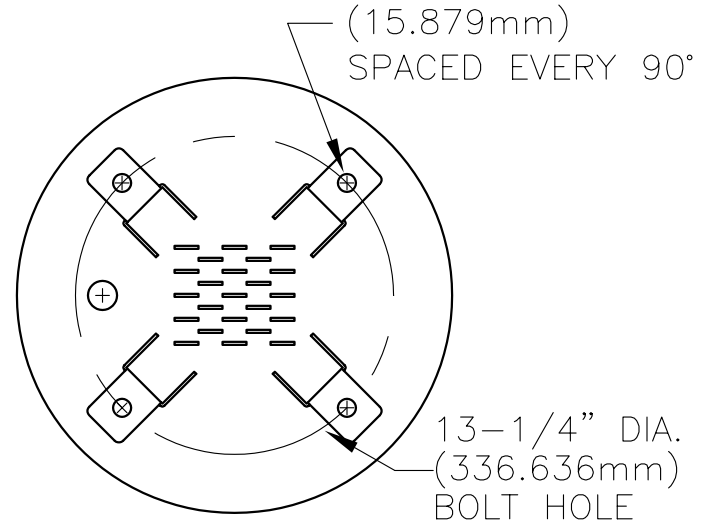


* = ITEMS NOT INCLUDED BUT ARE AVAILABLE UPON REQUEST.

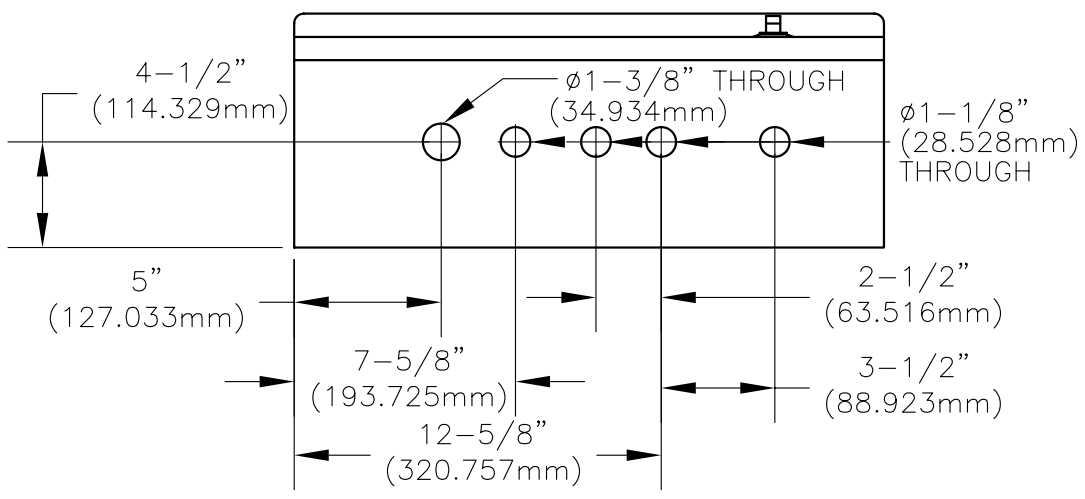
ITEM #	DESCRIPTION
1	BEACON L-864/L-865 DUAL RED/WHITE STROBE
2	POWER SUPPLY E-1DB
3	WATER TIGHT CABLE CONNECTOR WITH SEALING GLAND.
4	ENTRANCE HUB 3/4" (19.055mm)
5	ENTRANCE HUB 1" (25.407mm)
6	RIGID GALVANIZED CONDUIT OR STROBE CABLE.
7	#P2455L PHOTOCELL
8	VENT & FILTER COVER



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.

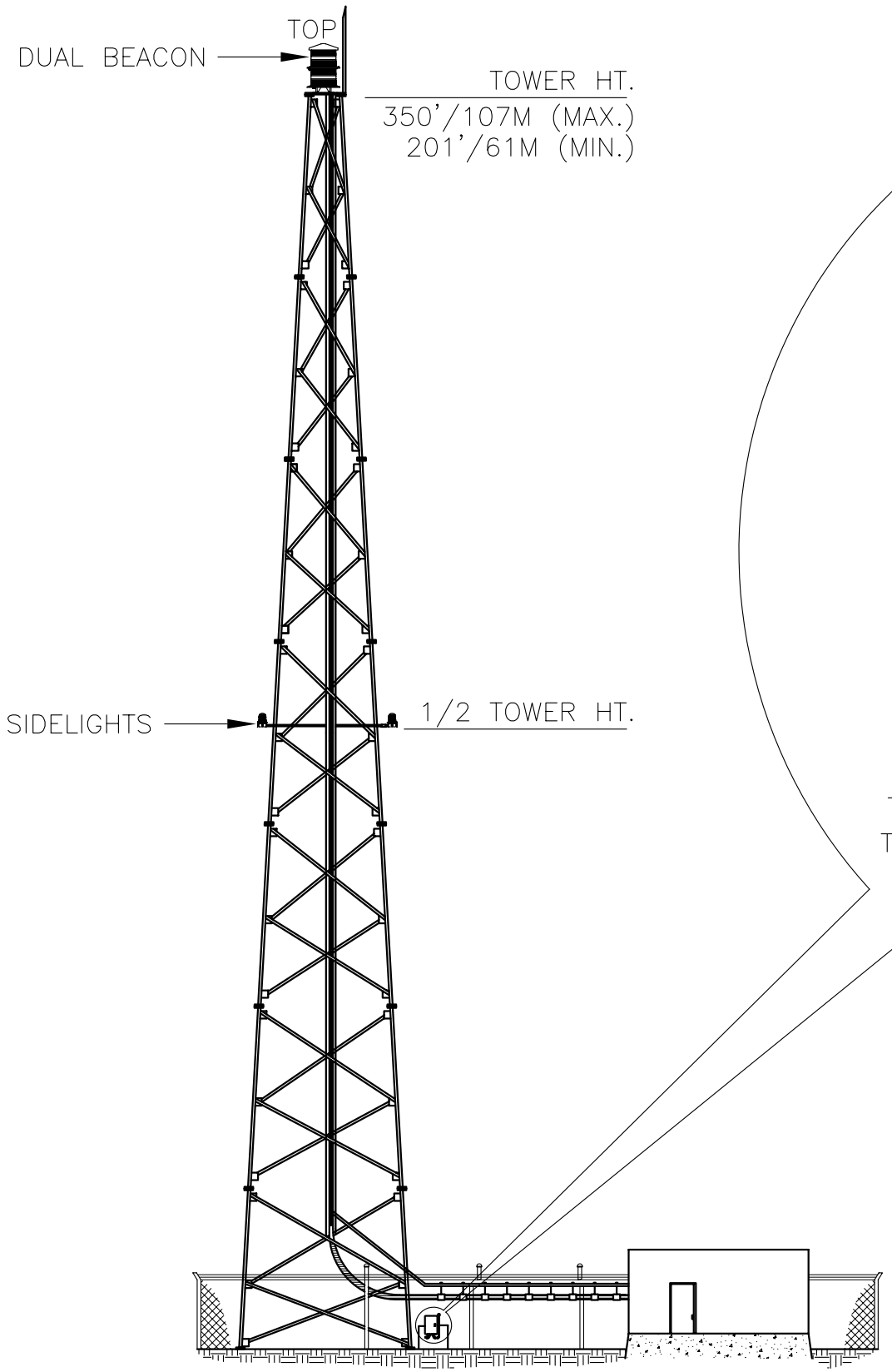
B. MOUNT BEACON HINGES SO LENS WILL OPEN UNOBSTRUCTED BY STRUCTURE.

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

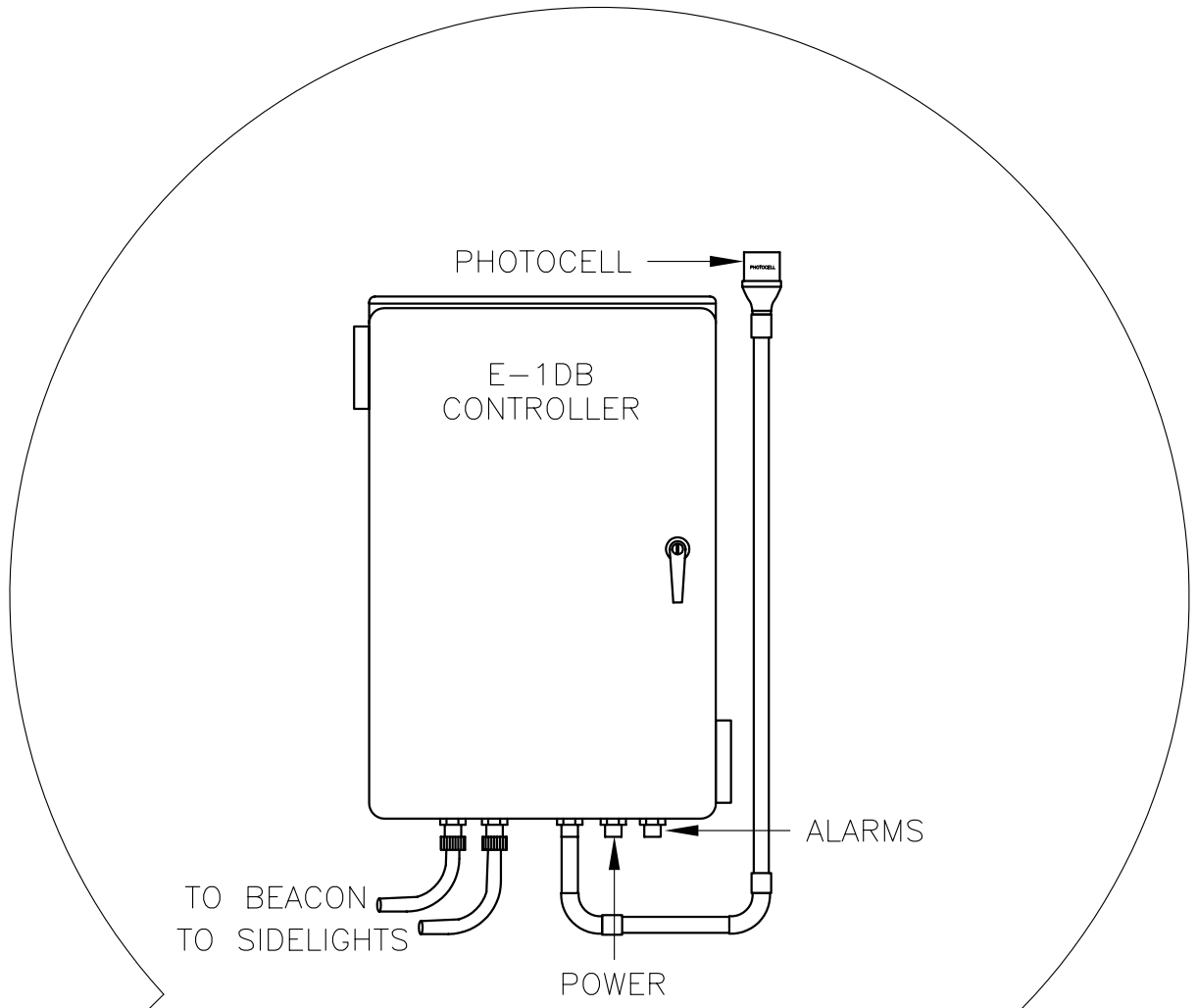
HOUSING DETAILS E-1DB
L-864/L-865 RED/WHITE STROBE

TWR Lighting, Inc.

APP'D	ENGINEER	CHK'D BY	
DRAWN BY: G.D.SEBEK		SHEET SIZE: B	SHEET QTY.: 1 OF 1
DATE: 06/17/97	SCALE: N.T.S.	DRAWING NO.: HD0-269	



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).

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

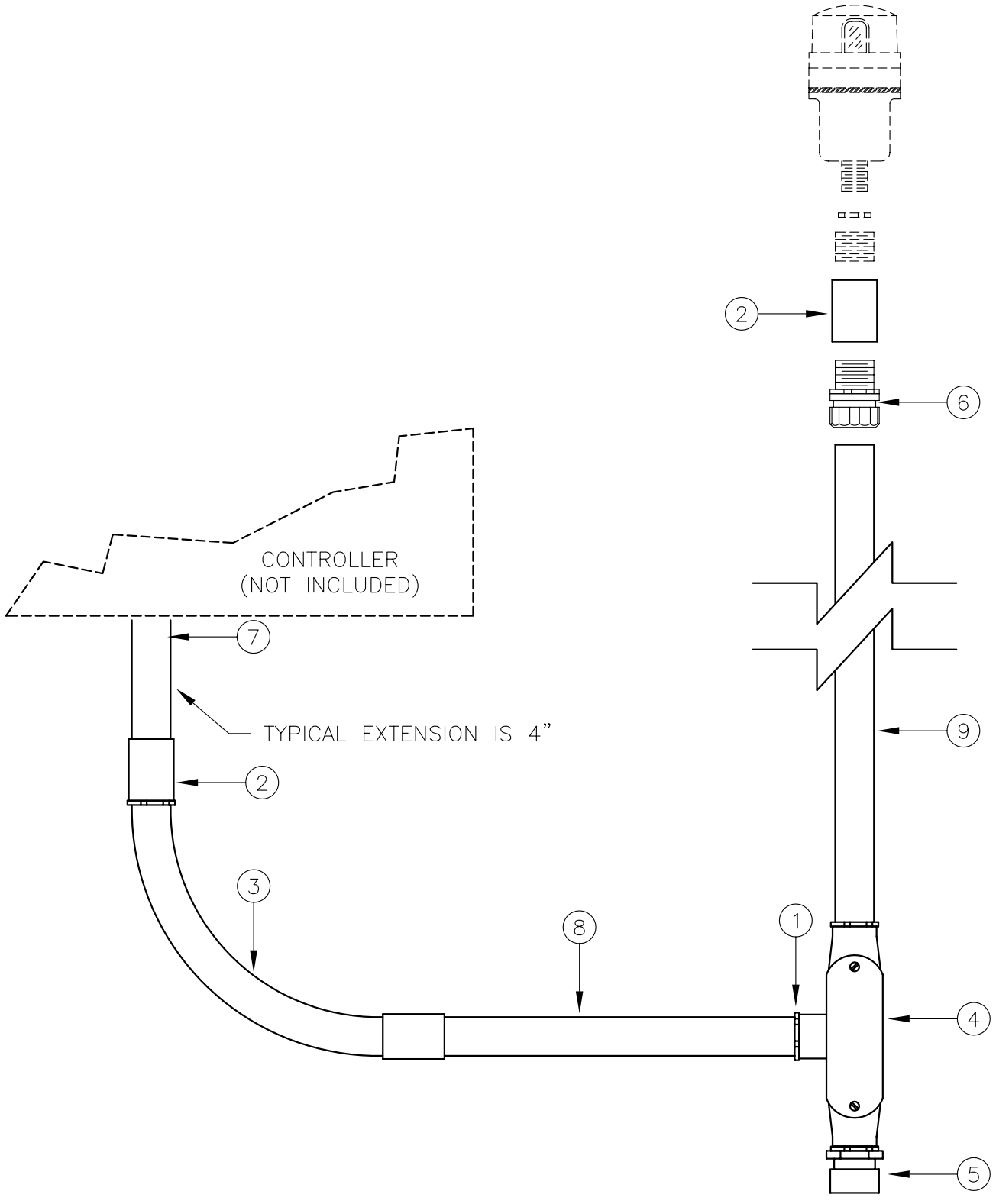
E-1DB INSTALLATION GUIDELINE

TWR Lighting, Inc.

APP'D	ENGINEER	CHK'D BY
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

ITEM NO.	QTY.	TWR PART NO.	DESCRIPTION
1	5	A314	3/4" LOCKNUT
2	3	CPLG34	3/4" COUPLING
3	1	EL34SW90	3/4" 90° SWEEP ELBOW
4	1	T27CG	3/4" CONDULET WITH COVER
5	1	5012902	3/4" BREATHER
6	1	HC-402	3/4" NO THREAD CONNECTOR
7	1	N34T4	3/4" x 4" NIPPLE
8	1	N34T18	3/4" x 18" NIPPLE
SEE NOTE #2 → 9	5'	CONDUIT34	3/4" CONDUIT

PHOTOCELL W/PIGTAIL
PROVIDED W/CONTROLLER



NOTES:
1. PHOTOCELL HAS TO BE MOUNTED IN UPRIGHT VERTICAL POSITION.
2. ITEM #9 MAY NEED TO BE CUT TO FIT AT JOB SITE. (THREADING NOT NEEDED DUE TO ITEM # 6.)

DATE:	LTR.	REVISION
03/12/01	E	ADDED ITEM #6

SSMTKIT

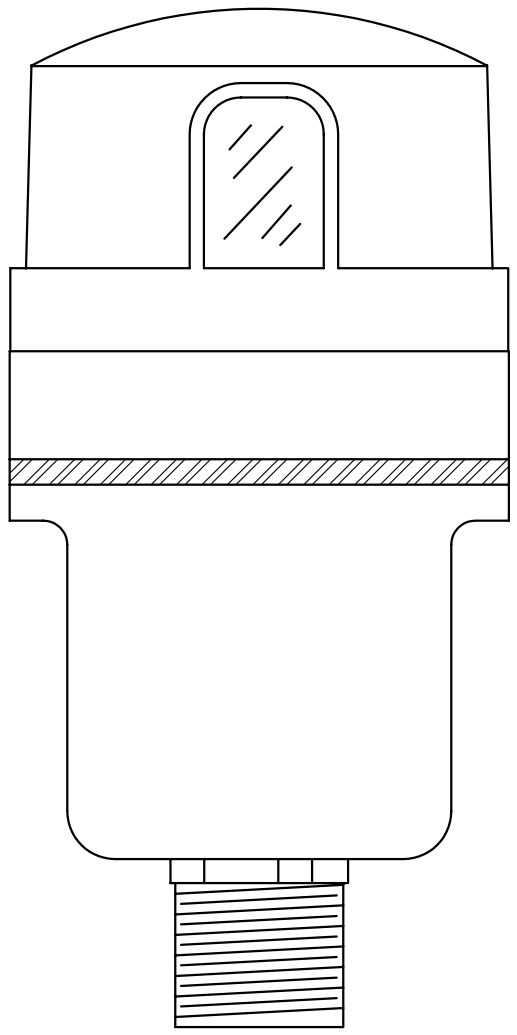
PHOTOCELL MOUNT KIT

TWR Lighting, Inc.

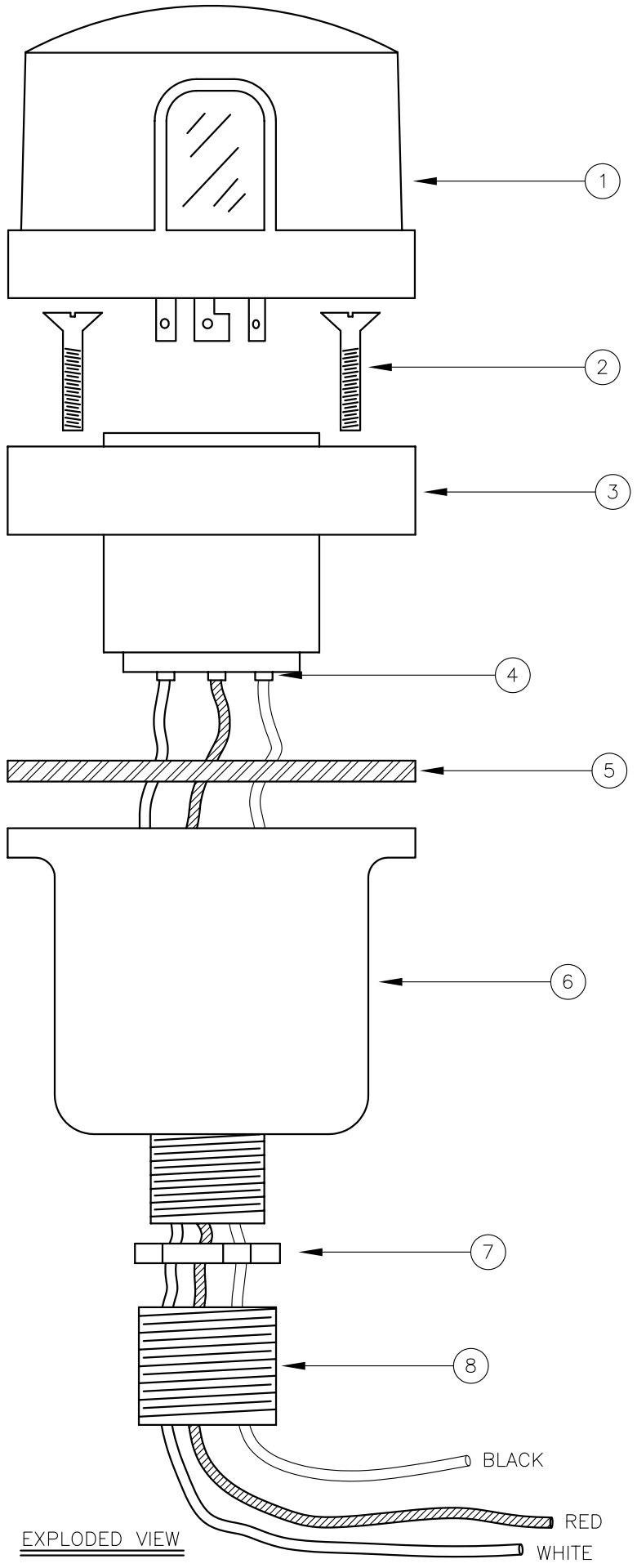
APP'D	ENGINEER	CHK'D BY

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

DATE	SCALE	DRAWING NO.
11/02/98	N.T.S.	100433



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:

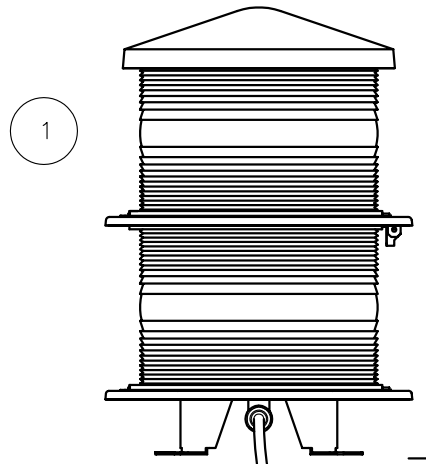
1. ITEM #8 CAN BE USED TO REDUCE 3/4" CONDUIT TO 1/2" CONDUIT AT THE HOUSING OR AT THE CONTROLLER ITSELF.
2. IF ADDITIONAL WIRE IS REQUIRED OVER THE FACTORY 20', USE THE FOLLOWING CHART.

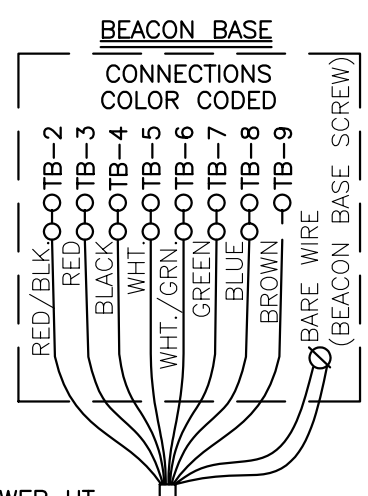
   21' TO 300' – 16 AWG TFFN
   301' TO 500' – 14 AWG TFFN

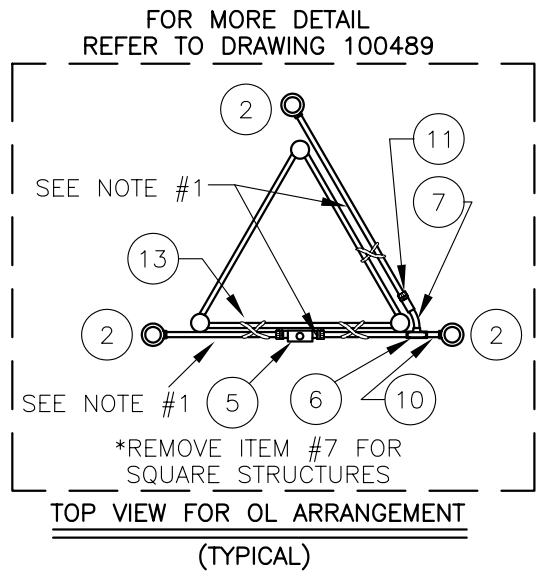
PHOTOCELL HOUSING DETAIL

TWR Lighting, Inc.

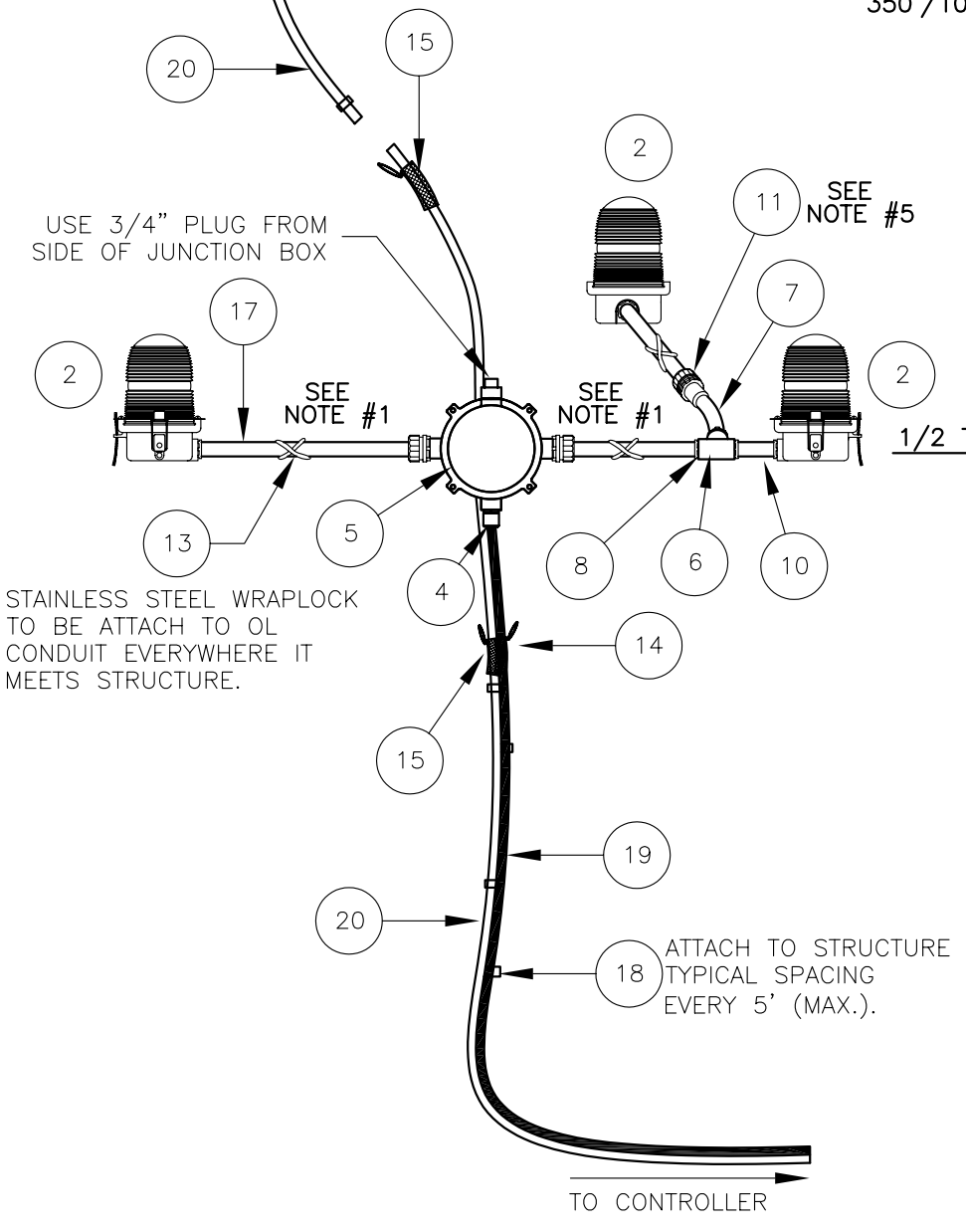
APP'D	ENGINEER	CHK'D BY	
DRAWN BY: E.A.SALAZAR		SHEET SIZE: B	SHEET QTY.: 1 OF 1
DATE: 10/18/95	SCALE: N.T.S.	DRAWING NO.: 100239	

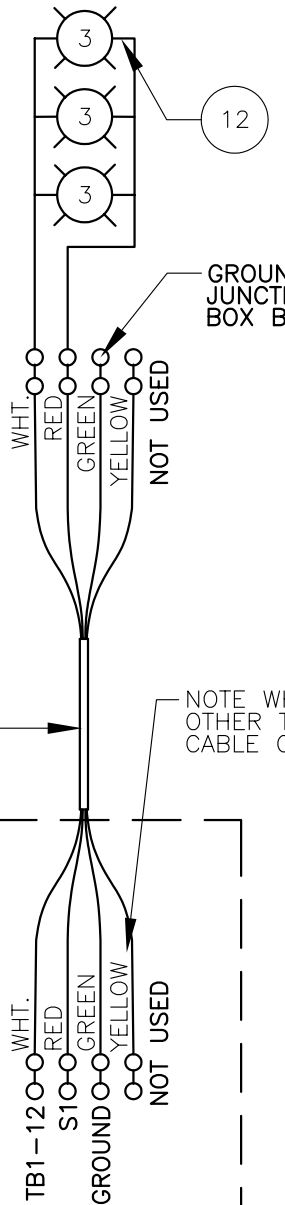


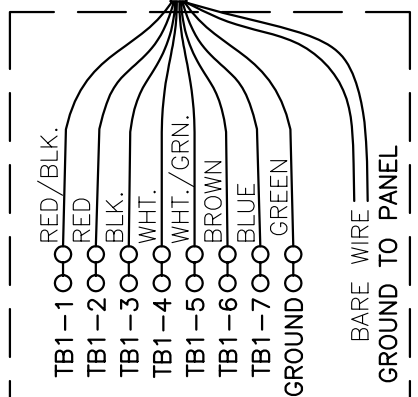




TOWER HT.
201'/61M (MIN.)
350'/107M (MAX.)







= TERMINAL

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.

LK1E1DB TOWER LIGHTING KIT CABLE RUN
(TOWERS 201'/61M TO 350'/107M/10' FACE WIDTH MAX)

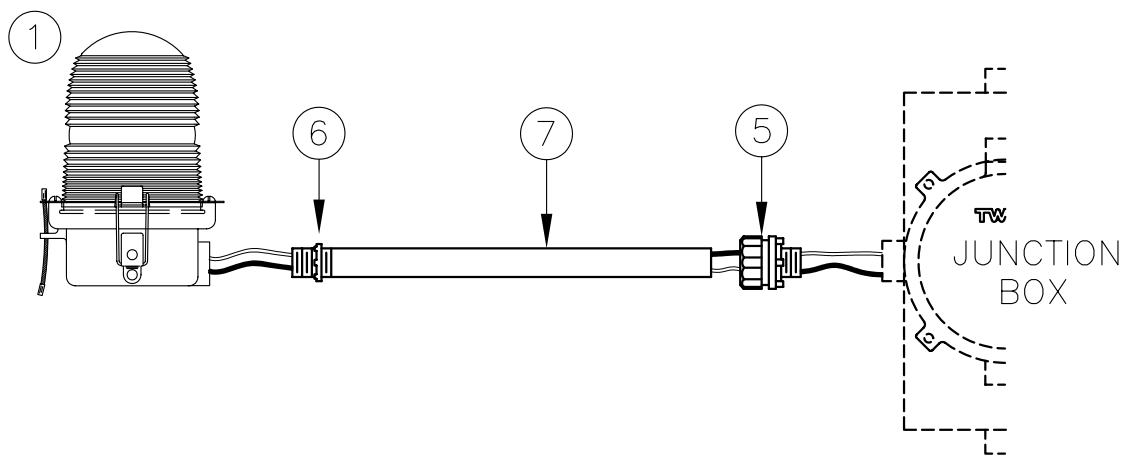
TWR Lighting, Inc.

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

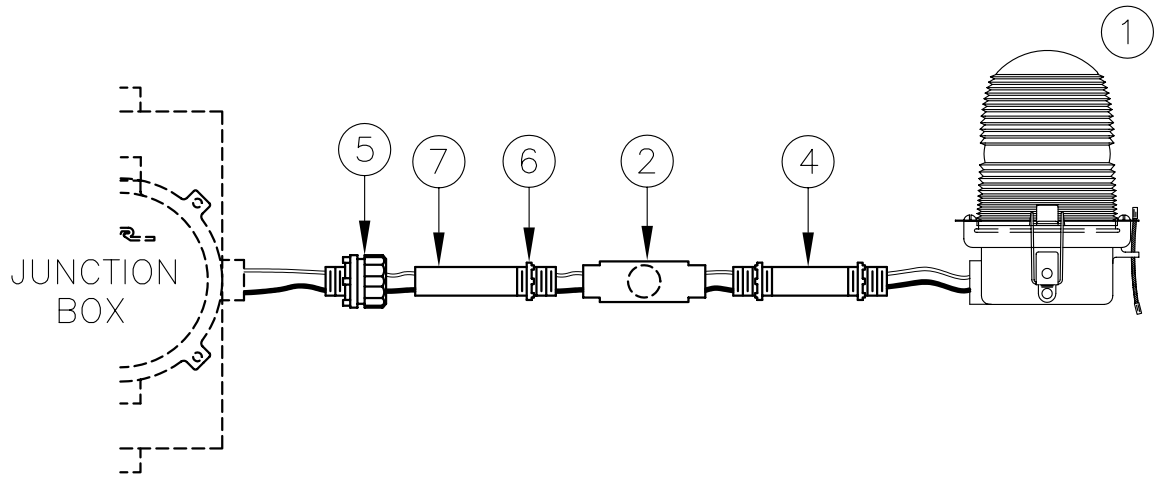
APP'D	ENGINEER	CHK'D BY

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

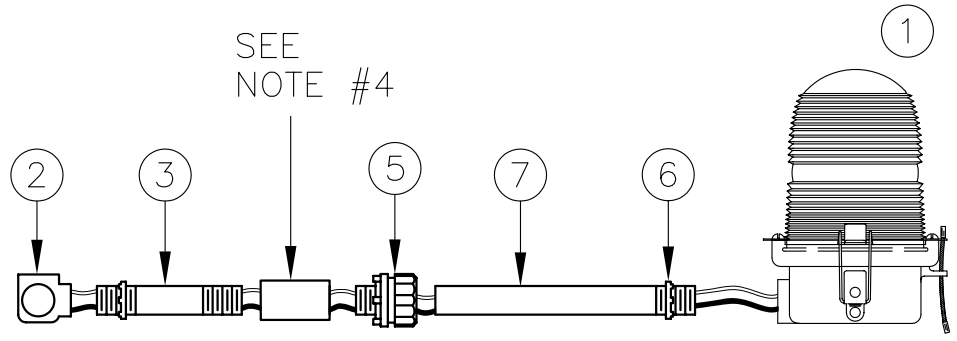
DATE	SCALE	DRAWING NO.
11/20/97	N.T.S.	600



VIEW A



VIEW B

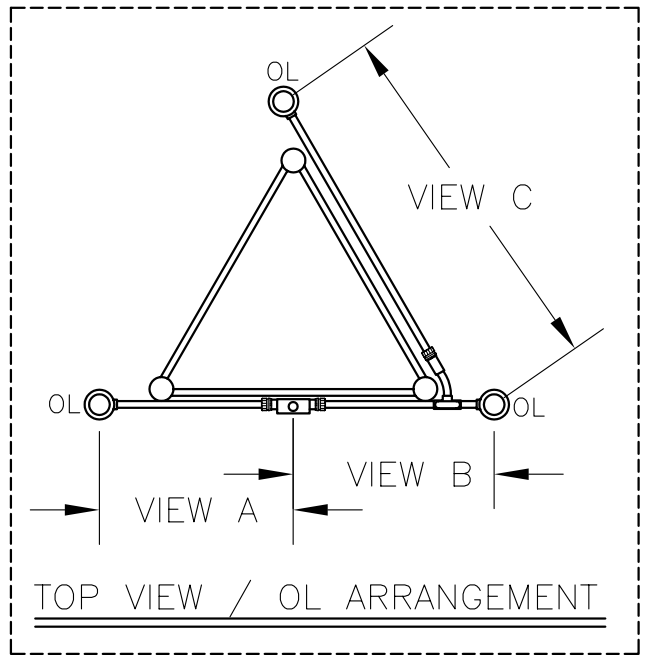


VIEW C

BILL OF MATERIALS

ITEM NO.	QTY.	TWR PART NO.	DESCRIPTION
1	3	OL1	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	HC-402	3/4" NO THREAD CONNECTOR
6	5	A314	3/4" CONDUIT LOCKNUTS
7	30'	CONDUIT34	3/4" CONDUIT

* = ITEMS NOT SHOWN



TOP VIEW / OL ARRANGEMENT

NOTES:

1. THIS DRAWING IS A TYPICAL INSTALLATION DETAIL FOR 3 OL-1 PER LEVEL SYSTEM.
2. IN VIEW C ITEM NUMBER 3 MAY BE OMITTED WHEN ARRANGING FOUR LEG TOWERS.
3. ITEMS #7 CUT TO LENGTH FOR PROPER EXTENTION OF OL1 FROM STRUCTURE (6"-12"). ATTACH ITEM #5 TO UNTHREADED CONDUIT TO COMPLETE ASSEMBLY.
4. USE COUPLING THAT IS PROVIDED BY ITEM #7.

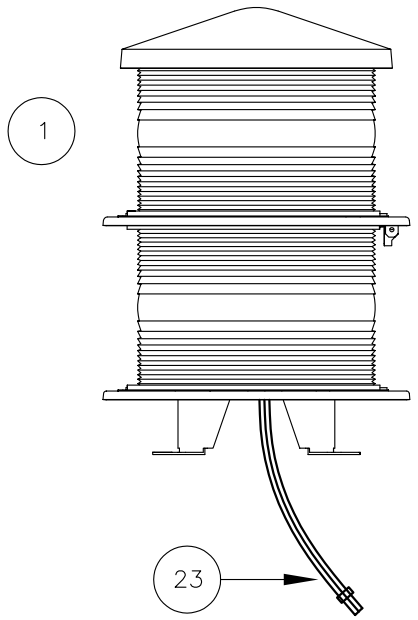
SLASSM

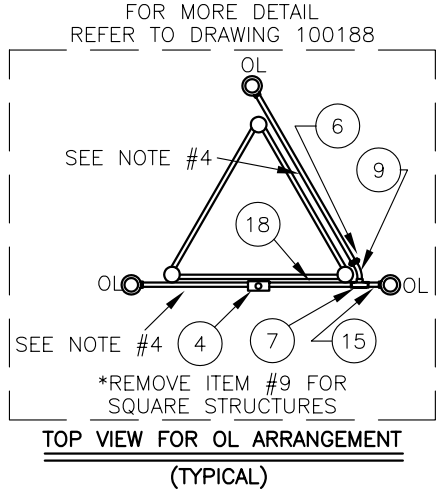
SIDELIGHT MOUNT ASSEMBLY

(10' FACE WIDTH MAX)

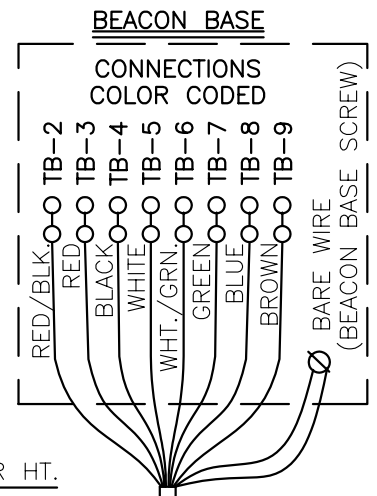
TWR Lighting, Inc.

APP'D	ENGINEER	CHK'D BY	
DRAWN BY F.DELACRUZ		SHEET SIZE B	SHEET QTY. 1 OF 1
DATE 05/23/00	SCALE N.T.S.	DRAWING NO. 100489	

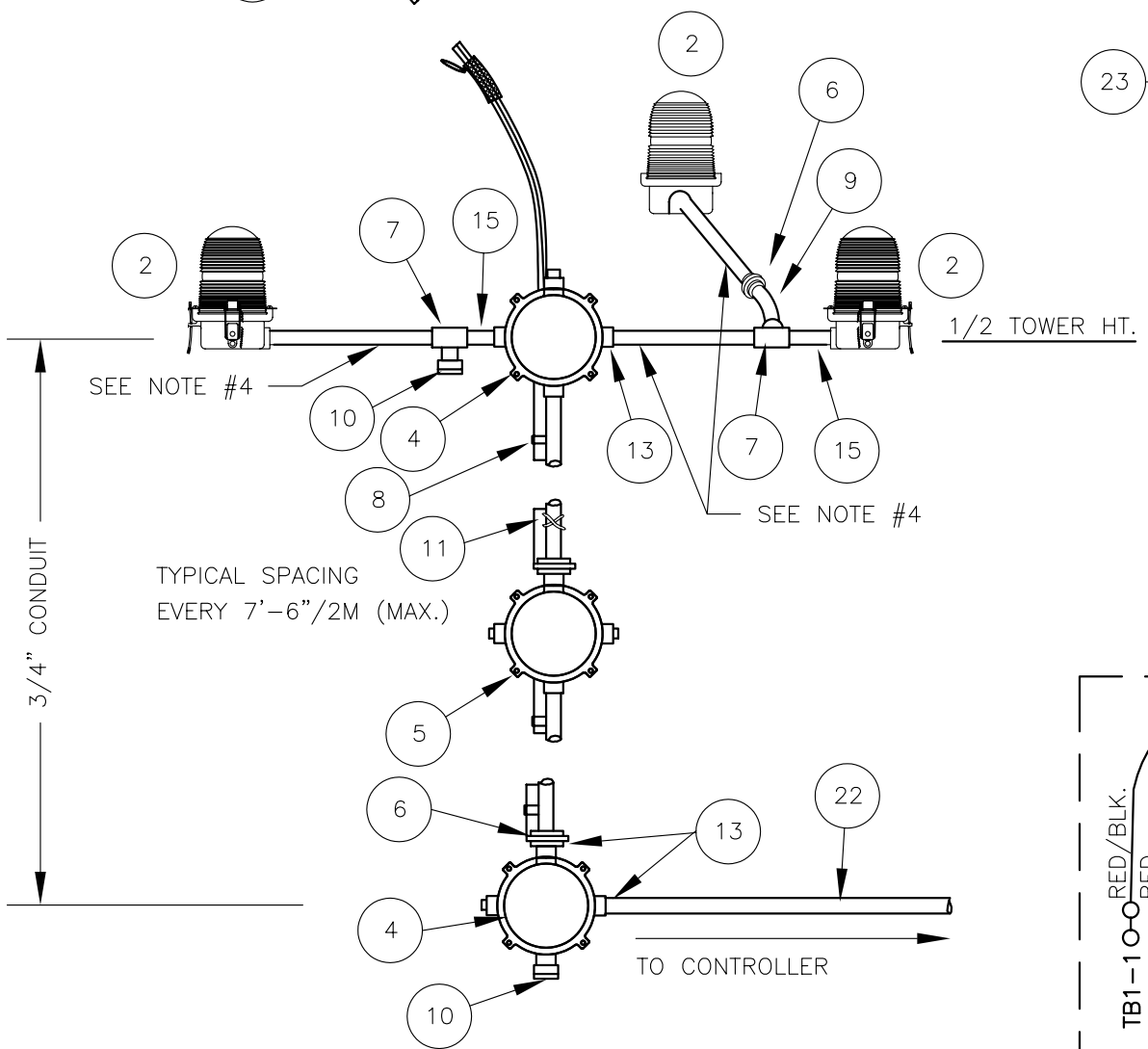


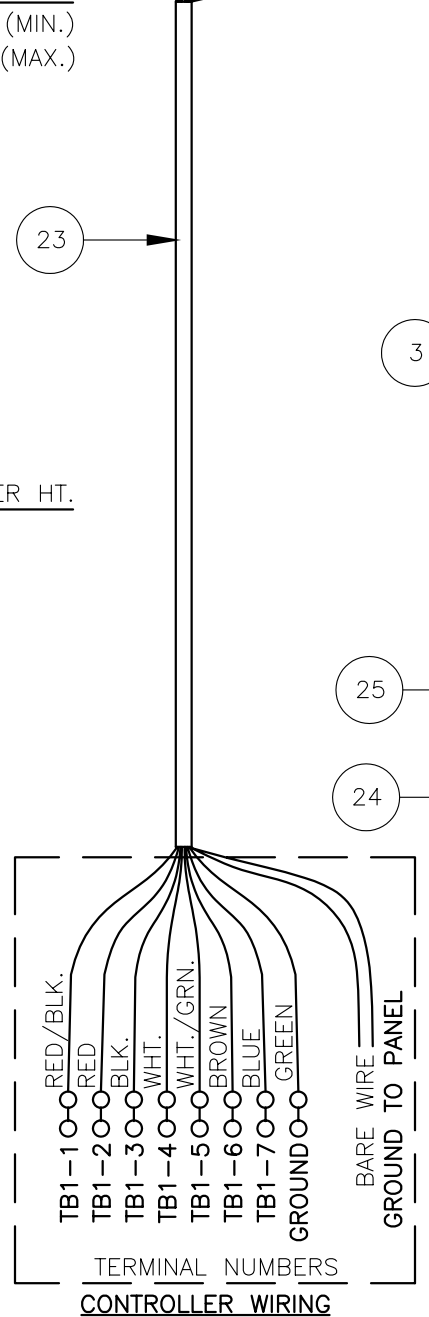


TOP VIEW FOR OL ARRANGEMENT
(TYPICAL)

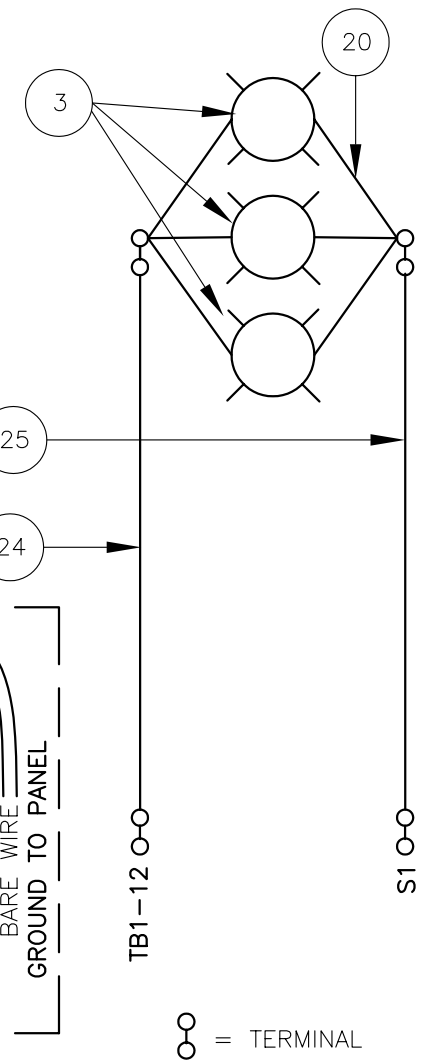


TOWER HT.
201'/61M (MIN.)
350'/107M (MAX.)





CONTROLLER WIRING



= TERMINAL

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	JB0	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:

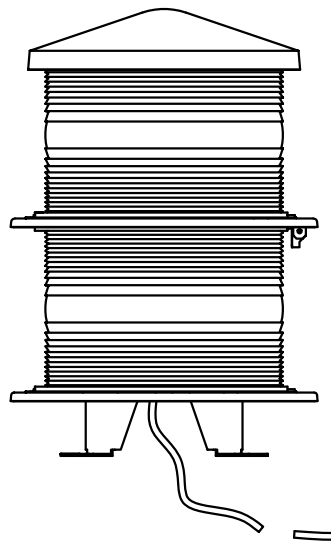
1) CONDUIT SIZE BASED ON USING TYPE THHN WIRE.
2) USE RIGID GALVANIZED STEEL CONDUIT.
3) BREATHERS ALLOW FOR CIRCULATION OF AIR TO PREVENT CONDENSATION.
4) ITEMS #15–#19 TO BE USED IN VARIOUS COMBINATIONS FOR OL1 RUN. EXTRA NIPPLES TO BE CUT TO FIT IF FACE WIDTH IS LARGER THAN 6'.
5) USE ITEM #14 TO 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.

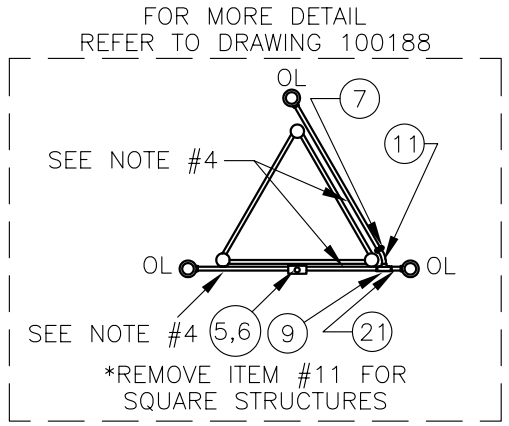
LK2E1DB LIGHTING KIT W/ CONDUIT FOR 3 OL-1
(TOWERS 201'/61M TO 350'/107M)

TWR Lighting, Inc.

APP'D	ENGINEER	CHK'D BY
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

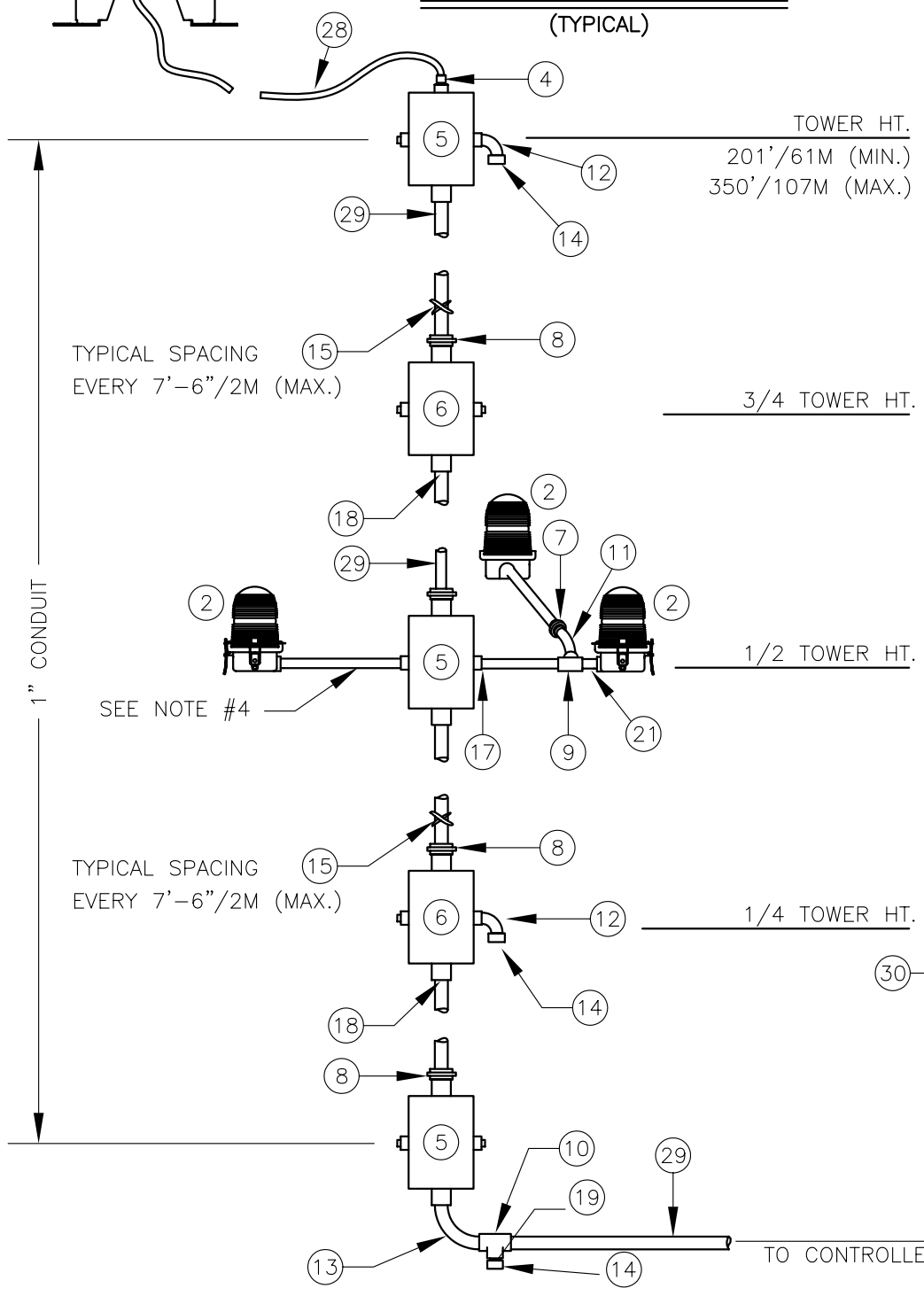
DATE:	LTR.	REVISION
08/02/00	C	CHANGED B.O.M.
01/13/00	B	CHG. WIRE CONNECTIONS

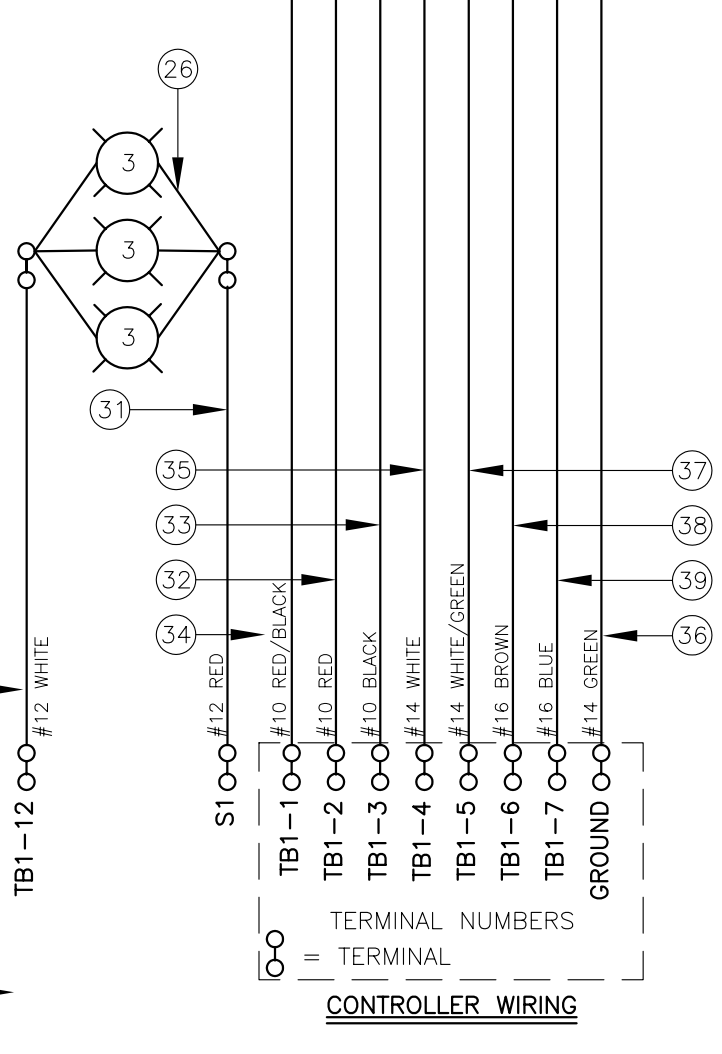


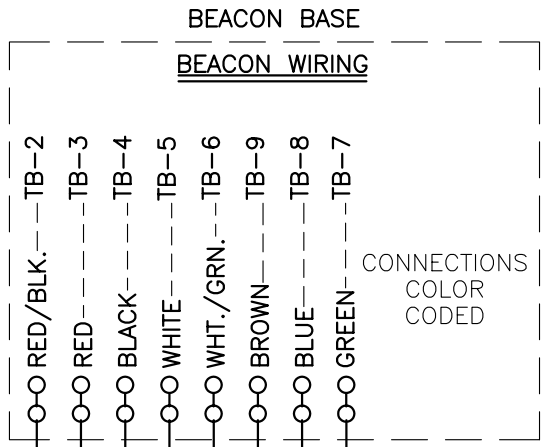


NOTES:

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)

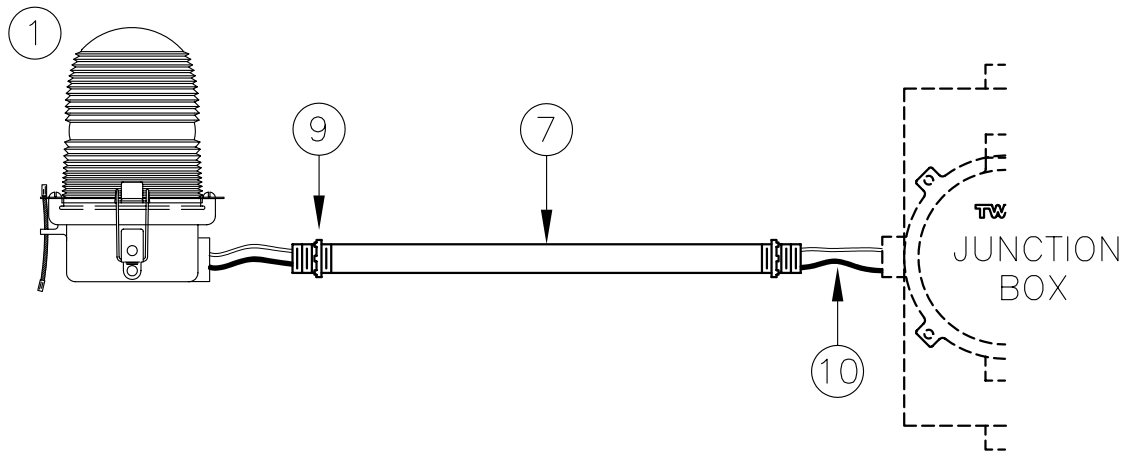
* = ITEMS NOT SHOWN

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

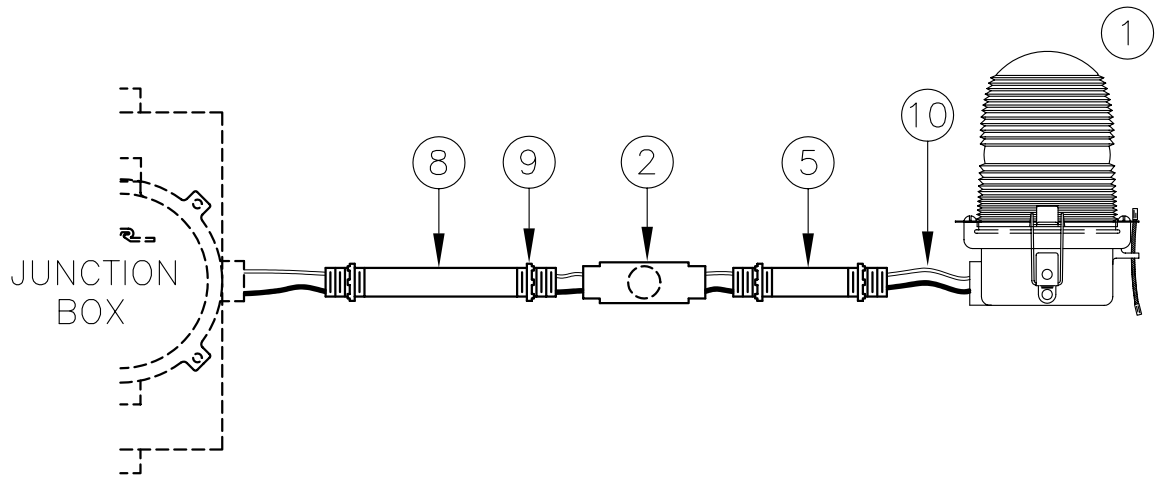
TWR Lighting, Inc.

APP'D	ENGINEER	CHK'D BY	
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	

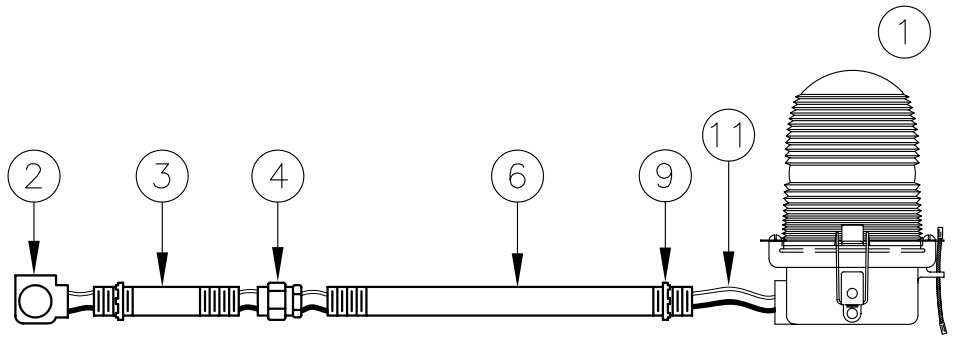
DATE:	LTR.	REVISION
08/02/00	C	CHANGED B.O.M.
01/13/2000	B	CHG. WIRE CONNECTIONS



VIEW A



VIEW B



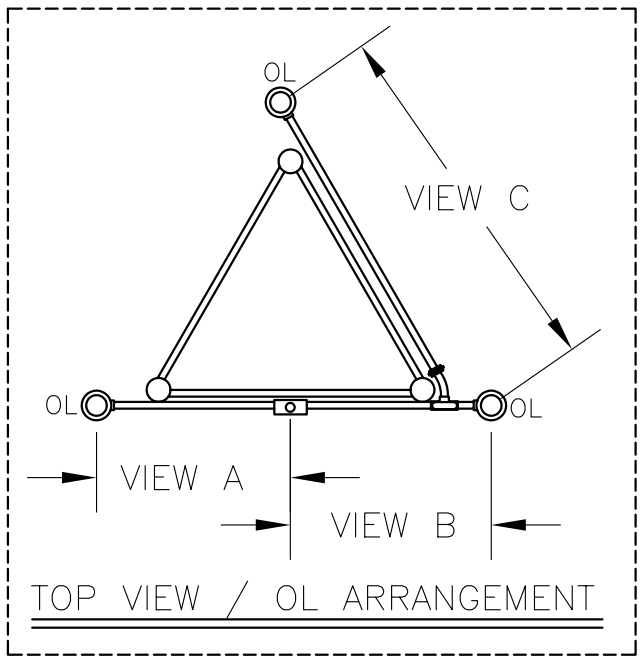
VIEW C

BILL OF MATERIALS

ITEM NO.	QTY.	TWR PART NO.	DESCRIPTION
1	3	OL1	3/4" OBSTRUCTION LIGHT
2	1	T27	3/4" CONDULET W/COVER AND GASKET
3	1	EL3430	3/4" 30° ELBOW
4	1	UNY205	3/4" UNION
5	1	N34T3	3/4" x 3" NIPPLE
6	1	---	3/4" NIPPLE = (FACE + 6")
7	1	---	3/4" NIPPLE = (FACE ÷ 2 + 36)
8	1	---	3/4" NIPPLE = (FACE ÷ 2)
9	5	A314	3/4" CONDUIT LOCKNUTS
10	2	---	#14 RED & WHT. WIRE (FACE − 2 + 36")
11	1	---	#14 RED & WHT. WIRE (FACE x 1.5 +24")

NOTES:

1. THIS DRAWING IS A TYPICAL INSTALLATION DETAIL FOR 3 OL−1 PER LEVEL SYSTEM.
2. IN VIEW C ITEM NUMBER 3 MAY BE OMITTED WHEN ARRANGING FOUR LEG TOWERS.
3. LENGTHS FOR SIDELIGHT RUNS MAY BE ACHIEVED BY MULTIPLE PIECES OF ITEM NUMBERS 6−8.
4. ITEMS 10 & 11 MAY COME IN BULK LENGTHS.



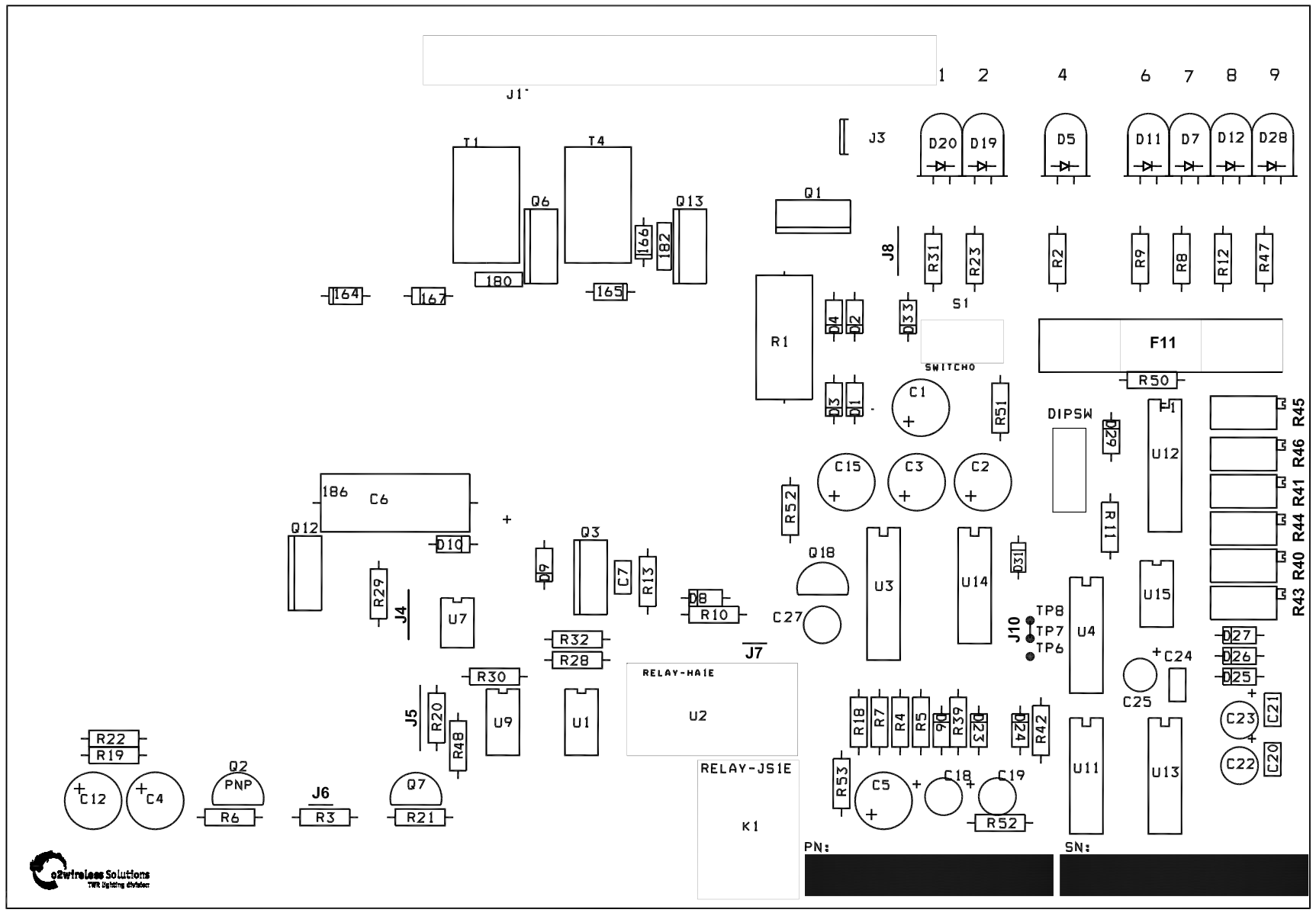
TOP VIEW / OL ARRANGEMENT

DATE:	LTR.	REVISION
6/06/96	A	ADDED NOTES (GDS)

3−OL−1 LIGHT LEVEL
DETAIL (EACH)

TWR Lighting, Inc.

APP'D	ENGINEER	CHK'D BY	
DRAWN BY: E.A.SALAZAR		SHEET SIZE: B	SHEET QTY.: 1 OF 1
DATE: 06/06/96	SCALE: N.T.S.	DRAWING NO.: 100188	



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

TWR Lighting, Inc.

APP'D	ENGINEER	CHK'D BY	
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	

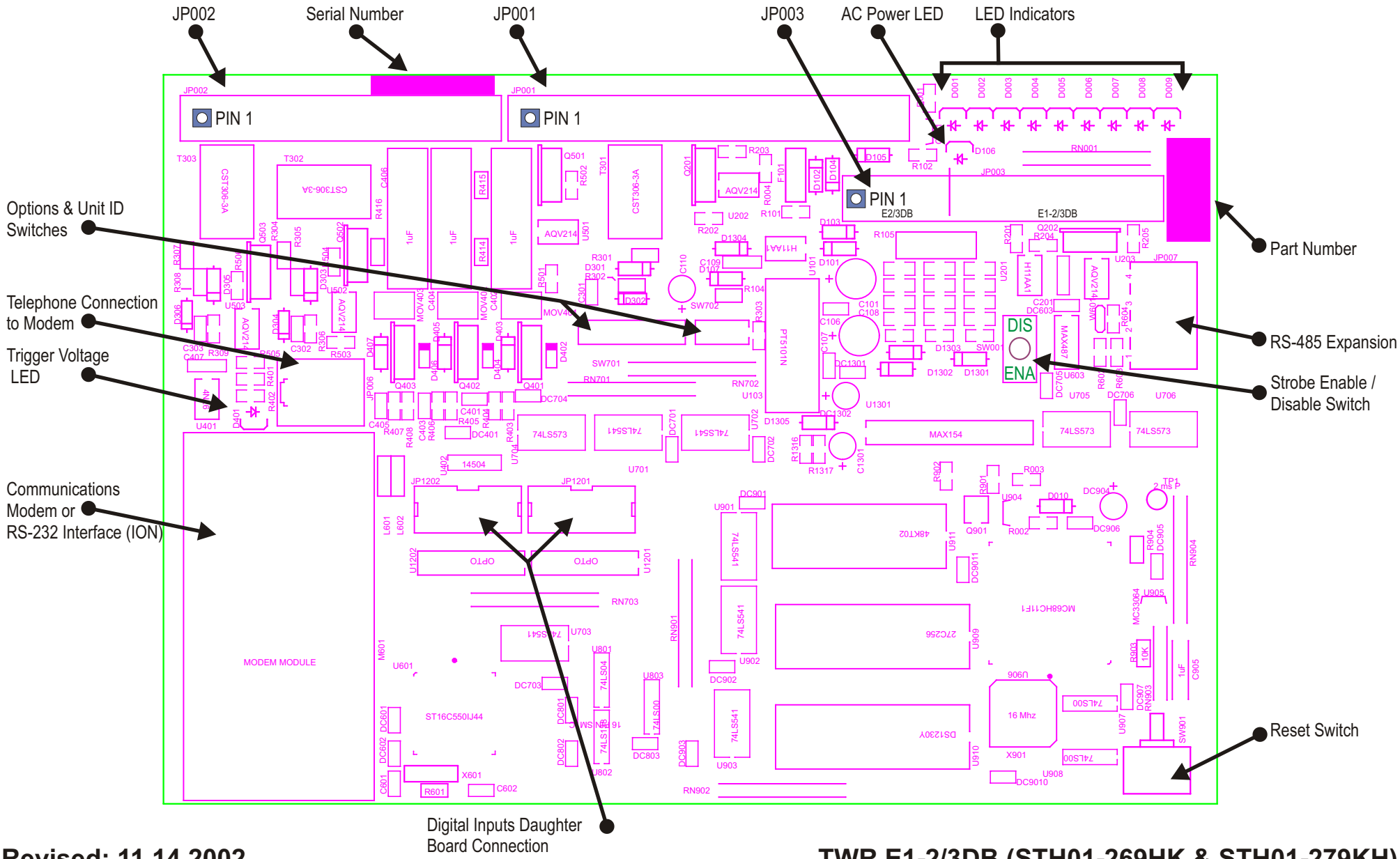
DATE:	LTR.	REVISION
01/09/01	B	MODIFIED PCB

PIN	Label	Description
JP002.1	- CAP1	Strobe 2 & 3 Capacitor Bank
JP002.2	- FTC3	Strobe 3 to Flash Head
JP002.3	- CAP1	Strobe 2 & 3 Capacitor Bank
JP002.4	- FTC2	Strobe 2 to Flash Head
JP002.5	- ST3	Strobe Fail 3 from CPU
JP002.6	- ST2	Strobe Fail 2 from CPU
JP002.7	- none	Jumper to JP002 pin 8
JP002.8	- none	Jumper to JP002 pin 7
JP002.9	- none	Jumper to JP002 pin 10
JP002.10	- none	Jumper to JP002 pin 9
JP002.11	- FTT3	Flash Tube Trigger 3 from CPU
JP002.12	- FTT2	Flash Tube Trigger 2 from CPU

PIN	Label	Description
JP001.1	- FTT1	Flash Tube Trigger 1 from CPU
JP001.2	- none	Jumper to JP001-pin 3
JP001.3	- none	Jumper to JP001-pin 2
JP001.4	- ST1	Strobe Fail 1 output from CPU
JP001.5	- P	Power Line
JP001.6	- CAP	Strobe 1 Capacitor Bank
JP001.7	- FTC1	Strobe 1 to Flash Head
JP001.8	- SSO	Red / White light Control
JP001.9	- none	No Connection
JP001.10	- none	Power Netural
JP001.11	- TV	Trigger Voltage
JP001.12	- GND	Ground
JP001.13	- A1	18 VAC from T2
JP001.14	- A2	18 VAC from T2
JP001.15	- TS	Slave Sync Signal

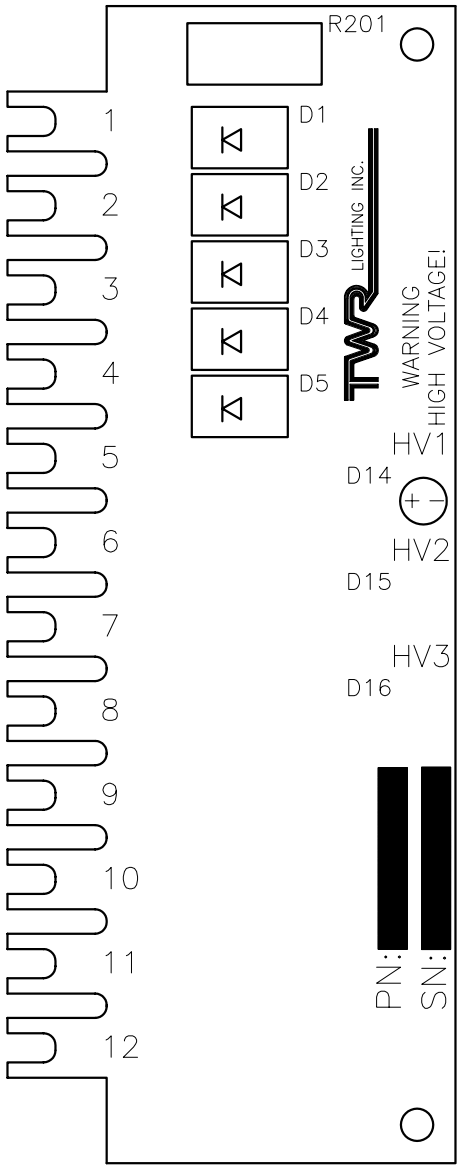
PIN	Label	Description
JP003.1	- none	No Connection
JP003.2	- CB2	Capacitor Bank 2 Voltage
JP003.3	- CB3	Capacitor Bank 3 Voltage
JP003.4	- SLA2-NC	Side Light 2 Alarm Normally Closed
JP003.5	- CB1	Capacitor Bank 1 Voltage
JP003.6	- BU PWR	DC Backup Power
JP003.7	- TB1-9*	SSR Photocell Input to CPU
JP003.8	- TB1-10	Power Netural
JP003.9	- TB1-8	Power Line
JP003.10	- TB1-9	SSR Photocell Output from CPU
JP003.11	- SLA-C	Side Light Alarm Common
JP003.12	- SLA1-NC	Side Light Alarm 1 Normally Closed

LED	Description
D001	- Flash Verify Strobe 1
D002	- Red Strobe Fail
D003	- Flash Verify Strobe 2
D004	- AC Power ON
D005	- Flash Verify Strobe 3
D006	- Trigger Voltage Present
D007	- Day OFF / Night ON
D008	- Modem Carrier / Alarm Indicator
D009	- Flash Trigger



Revised: 11.14.2002

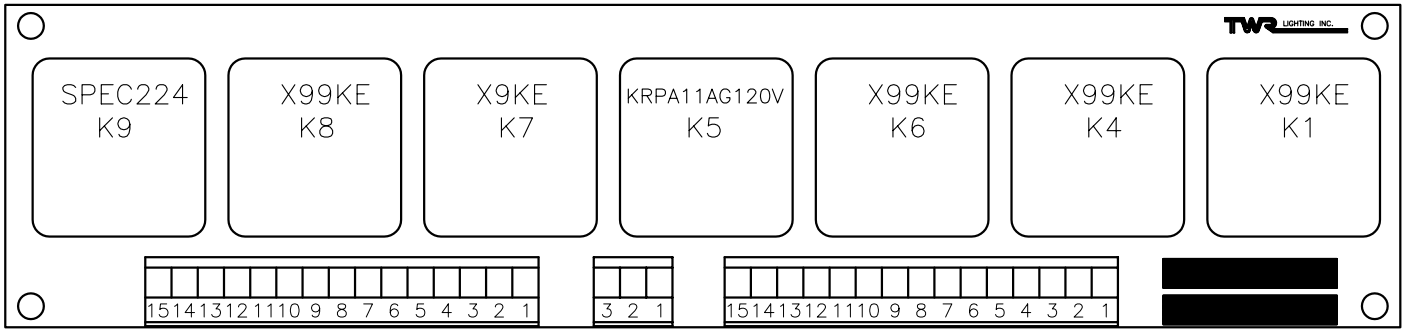
TWR E1-2/3DB (STH01-269HK & STH01-279KH)



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

TWR Lighting, Inc.

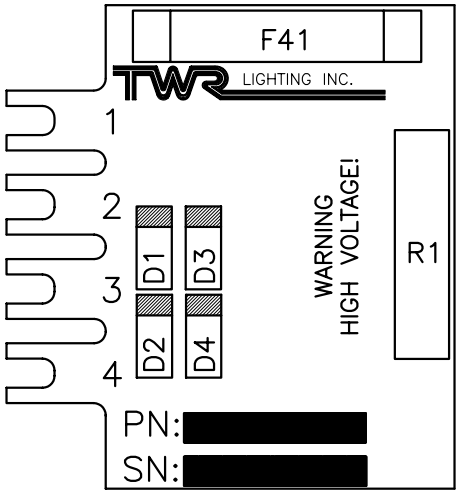
APP'D	ENGINEER	CHK'D BY
DRAWN BY: E.A.SALAZAR	SHEET SIZE: A	SHEET QTY.: 1 OF 1
DATE: 11/07/98	SCALE: FULL	DRAWING NO.: H02-226A



E-1 DB RELAY PCB
(PCB3)

TWR Lighting, Inc.

APP'D	ENGINEER	CHK'D BY
DRAWN BY: E.A.SALAZAR	SHEET SIZE: A	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)

TWR Lighting, Inc.

APP'D	ENGINEER	CHK'D BY

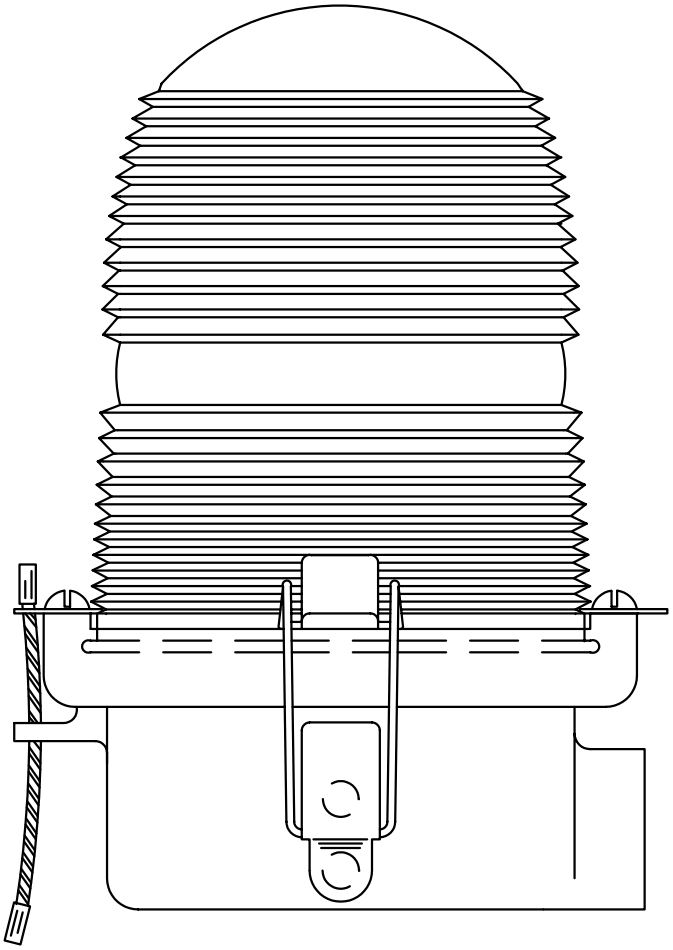
DRAWN BY	SHEET SIZE	SHEET QTY.
E.A.SALAZAR	A	1 OF 1

DATE	SCALE	DRAWING NO.
06/13/97	N.T.S.	H04-269

TWR Lighting, Inc.

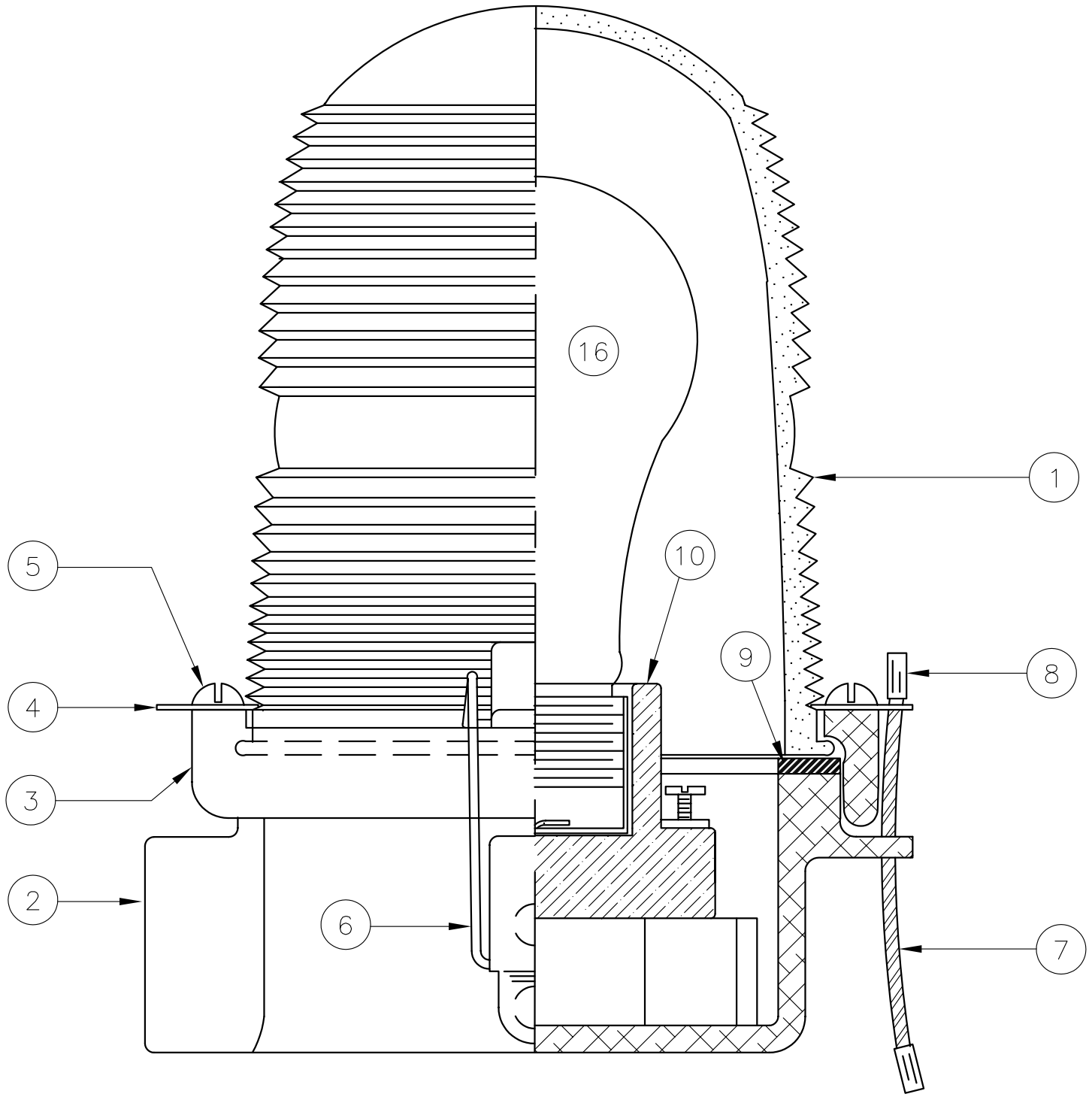
4300 WINDFERN RD. #100
HOUOSTON, TX. 77041
FAX: (713) 973-9352
PHN: (713) 973-6905

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	105C	SINGLE SIDELIGHT BODY
	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.

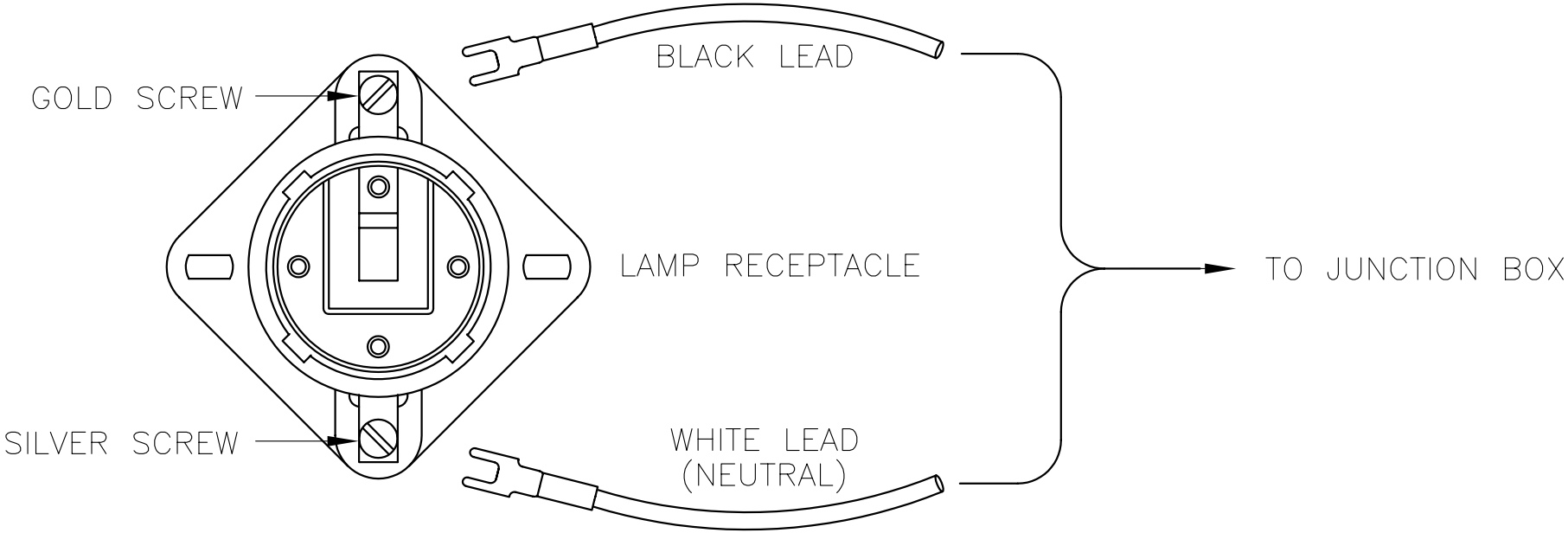
OL1

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

TWR Lighting, Inc.

APP'D	ENGINEER	CHK'D BY	
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
05/13/02	B	UPDATED B.O.M.



SIDELIGHT RECEPTACLE WIRING

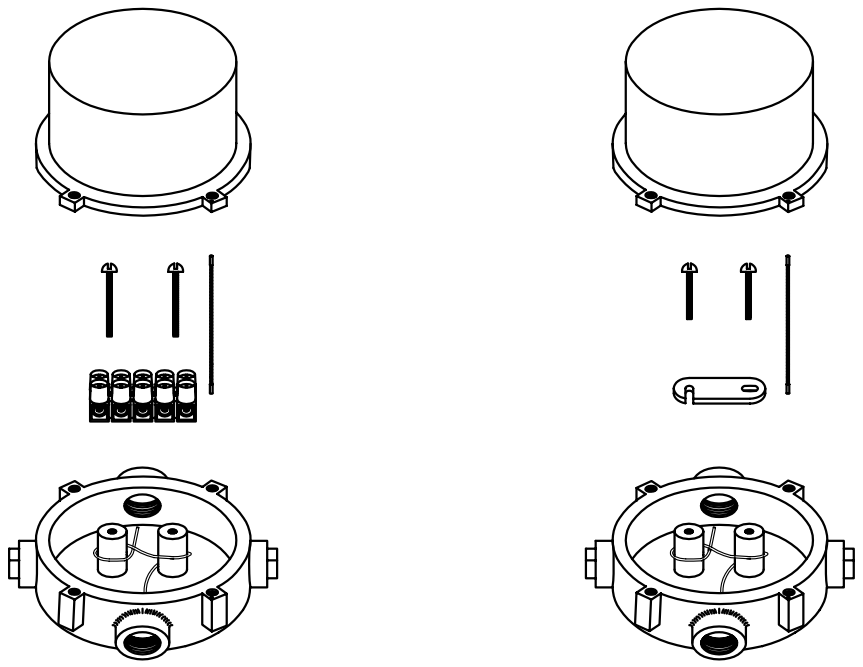
TWR Lighting, Inc.

APP'D	ENGINEER	CHK'D BY

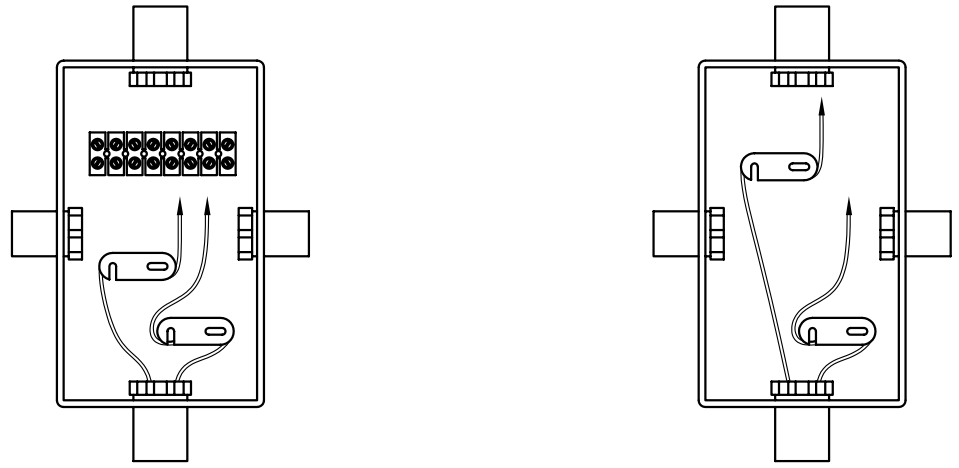
DRAWN BY	SHEET SIZE	SHEET QTY.
G.D.SEBEK	A	1 OF 1

DATE	SCALE	DRAWING NO.
6/8/91	N.T.S.	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

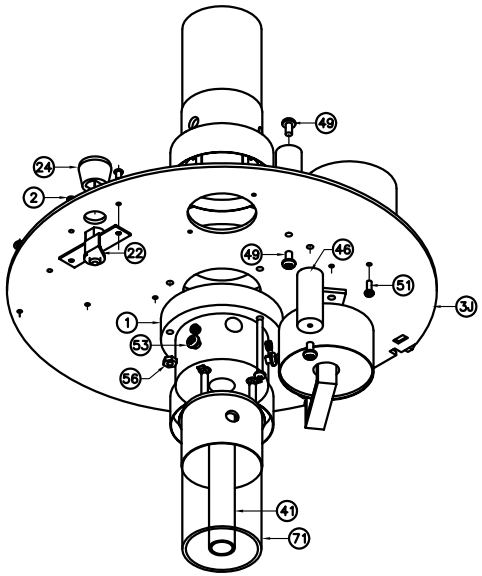
JUNCTION AND STRAIN RELIEF BOXES

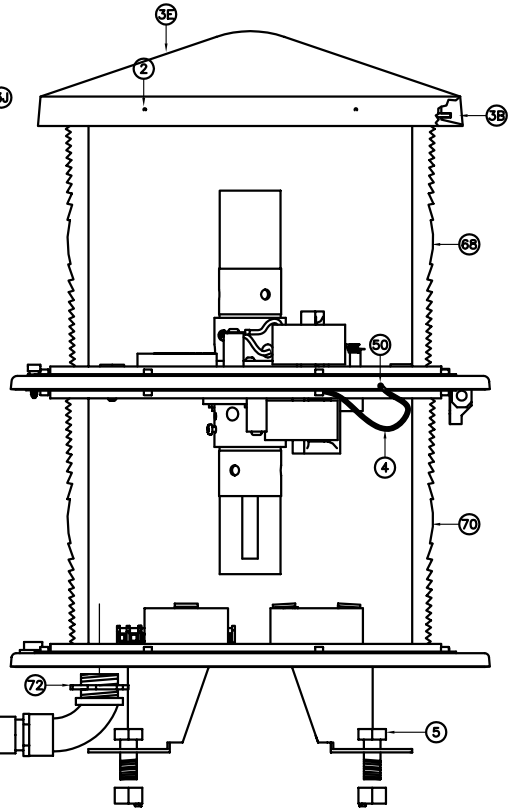
TWR Lighting, Inc.

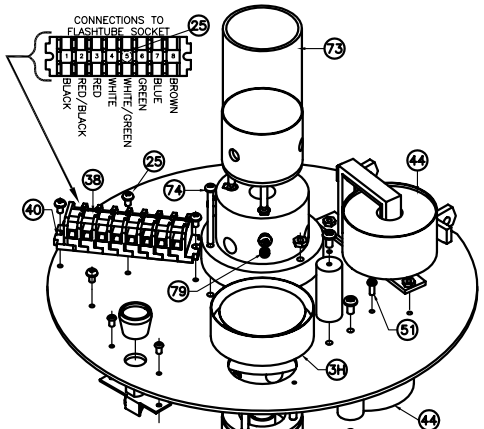
APP'D	ENGINEER	CHK'D BY

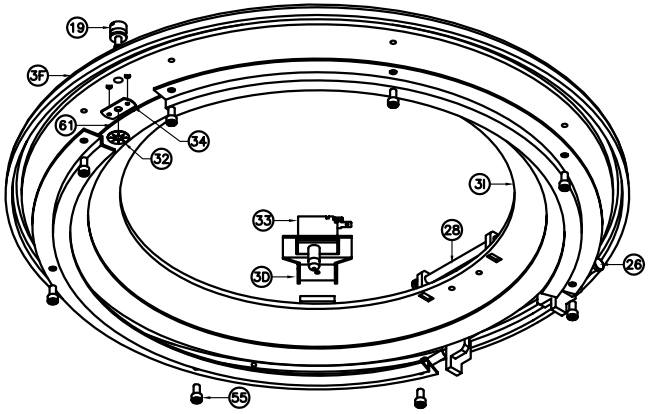
DRAWN BY	SHEET SIZE	SHEET QTY.
G.D.SEBEK	B	1 OF 1

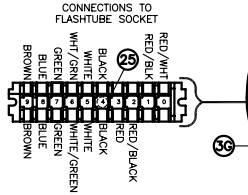
DATE	SCALE	DRAWING NO.
7/26/93	N.T.S.	100089

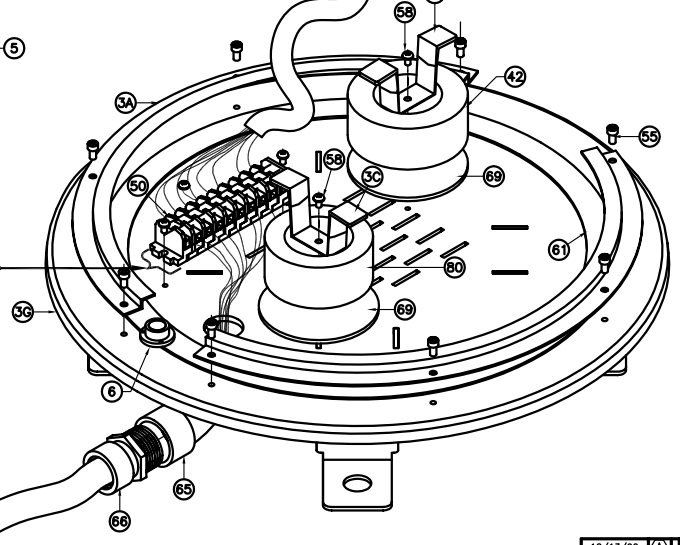












BILL OF MATERIALS

ITEM	QTY.	TWR PART NO.	DESCRIPTION
1	2	100319	DB FLASHTUBE SOCKET
2	10	18PRSS	178x.45 S.S. POP RIVET #45
3	1	STDBEAMKIT	DUAL BEACON FRAME KIT
3A	6	100337	DB LENS RETAINER RING
3B	6	100368	DB CAP BRACKET
3C	2	100396	INDUCTOR BRACKET
3D	1	100395M	DB SAFETY BRACKET
3E	1	100344	CAP DB 6 HOLES .1
3F	1	100342	DB UPPER HINGE ASSEMBLY
3G	1	100360	DB BASE ASSEMBLY
3H	2	100367	DB VENT CAP
3I	1	100343	DB LOWER HINGE ASSEMBLY
3J	1	100345	DB HATCH PLATE
4	1.75	7X7SS	1/16 7x7 S.S. WIRE
5	4	58X112	A325 5/8" X 1-1/2" WITH ANCO NUT
6	1	2-10000	2-10000000 CIRCULAR SPIRIT LEVEL
* 7	15	FV18-12PT-1	20 AWG ISOLATED FERROLE
8	3.8'	SR-GS20-8	HIGH TEMP 8/20 AWG CABLE
9	–	––	––
10	3	14FWDB	1/4 FW CH16L 18-8 .265 ID/.5
11	–	––	––
12	–	––	––
13	–	––	––
14	–	––	––
15	–	––	––
16	1	100360-03	DB CONNECTOR BRACKET
17	–	––	––
18	–	––	––
19	1	121340712	DB QUICK OPEN CAPTIVE SCREW
20	–	––	––
21	0.417	20AWGGRN	20AWG TEFLON TYPE EE M16878/5
22	1	571050110	DB SPRING LATCH
* 23	24	8NFW	#8 NYLON FLAT WASHER
24	1	162320141	NYLON KNOB FOR DB LATCH
25	2	832X38PPHN	8-32 x 3/8 PAN PHILLIPS HEAD NYLON SCREW
26	2	14X34CLVP	1/4 x 3/4 SHORT S/S CLEVIS PIN
27	–	––	––
28	1	14X358CLVP	1/4x3 5/8 LONG S/S CLEVIS PIN
* 29	1	STCONLAB2	DRAWING #100223 PRODUCT LABEL
* 30	4	12SSCP	1/2 S/S COTTER PIN
31	–	––	––
32	1	1261	12-6-1 NYLON CAPTIVE SCREW FAS
33	1	STL02003	CHERRY SWITCH, #E69-00A
34	1	121102013	DB QUICK OPEN SCREW FLAT RECEP
35	0.167	20AWGBLK	20AWG BLACK
* 36	1	070-4500	070-4500 DB HATCH SPRING S/S/
37	0.5	16AWGBLK	16AWG TEFLON TYPE EE BLACK
38	18	525B	BUCHANNAN
39	0.5	16AWGRED/WHT	16AWG TEFLON TYPE EE RED/WHT
40	2	530B	BUCHANAN END SECTION
41	1	INSUTUBE	DB CERAMIC INSULATOR
42	1	INDCTRC5001	INDUCTOR, 0.47MH TRANSFORMER 2
43	0.5	16AWGRED/BLK	16AWG RED/BLACK WIRE
44	2	STC05005	TRIGGER TRANSFORMER 25KV
45	–	––	––
46	2	INSULATOR	CERAMIC INSULATOR SMITH 2617 N
* 47	6	BU27200	FLASHTUBE SOCKET INSERT
48	0.5'	HEATSHRINK2	GLUE LINED HEAT SHRINK 1/2"
49	4	1032X38PHH	10-32x3/8 PHILLIPS BINDER HEAD
50	9	832X14PHH	8-32x1/4 PHILLIPS PAN HEAD S
51	4	632X38PHH	6-32x3/8 PHILLIPS PAN HEAD S
* 52	4	632X12PHH	6-32x1/2 PHILLIPS PAN HEAD S
53	6	1032X12PHH	10-32x1/2 PHILLIPS BINDER HEAD
* 54	1	1032FW	#10 FLAT WASHER
55	24	1032X38PHW	10-32x3/8 SS PHIL HD CAPTIVE S
56	3	832NUT	8-32 NUT
57	2	18RAD18277	T & B CONNECTOR
58	3	832X12PHH	8-32x1/2 PHILLIPS PAN HEAD S
59	1	18BLUE	18AWG BLUE BELDON 8522-006/CA
60	1	STBEAGSK1	GASKET, NEOPRENE, 13 1/4 x 15
61	3	STBEAGSK2	GASKET, NEOPRENE, 3/16x15 1/40
62	19	TY223M	HI TEMP TY WRAPS T&B TEFZEL
63	0.083	18BROWN	18AWG BROWN BELDON 8522-007/C
64	4	14RB10R	BULK RB877 P&B
65	1	EL190S	1" 90° SHORT ELBOW GALVANIZED
66	1	CGB396SA	1" CORD CONNECTOR .625 TO .75
67	–	––	––
68	1	STDBRLENS	RED DB LENS
69	2	100394-02	INDUCTOR BOTTOM PAD GASKET
70	1	STDBCLENS	CLEAR DB LENS
71	1	STFLSHTB6	G01-109
72	1	A315	1" CONDUIT LOCKNUT, GALV.
73	1	STFLSHTB7	G01-112
74	3	832X2PHH	8-32 x 2 PHILLIPS PAN HEAD
75	4	58X112	A325 5/8 X 1-1/2 WITH ANCO L/N
76	–	––	––
77	1	GSX028	HEAT TREATED FIBERGLASS SLEEVE
78	4	CSLG62X100	1/16 COPPER SLEEVE
79	6	1032X12SCSS	FLASHTUBE SOCKET INSERT SCREW
80	1	100453	135 UH ± 3% INDUCTOR

* = ITEMS NOT SHOWN

STDBEACON ASSEMBLY

e2wireless Solutions
TWR lighting division

DRAWN BY	E.A.SALAZAR	APP'D	
DATE	04/19/00	CHK'D BY	
SCALE	1/4"=1"	ENGINEER	
SHEET SIZE	B	SHEET NO.	1 OF 1
DRAWING NO.	100414		

DATE:	LTR.	REVISION
12/13/00	(A)	ADDED MATERIALS