

INSTRUCTION MANUAL

**Flight Light, Inc.
ZA737/ZA757
PRECISION APPROACH PATH INDICATOR
(STYLE B)**



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INSTRUCTION MANUAL

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SECTION ONE

SIGNAL PRESENTATION AND SITING

1.10 Signal Presentation

The precision approach path indicator (PAPI) is a system of either four or two identical light units placed on the left of the runway aimed outward into the approach zone on a line parallel to the runway. The front face of each unit is perpendicular to the runway centerline. The boxes are positioned and aimed to produce the signal presentation described below.

L-880 “Four Box System”: When making an approach, the pilot will:

- (1) When on or close to the established approach path, see the two units nearest the runway as red and the two units farthest from the runway as white; and
- (2) When above the approach path, see the unit nearest the runway as red and the three units farthest from the runway as white; and when further above the approach path see all the units as white; and
- (3) When below the approach path, see the three units nearest the runway as red and the unit farthest from the runway as white; and when further below the approach path see all units as red.

L-881 “Two Box System”: when making an approach, the pilot will:

- (1) When on or close to the established approach path, see the unit nearest the runway as red and the other unit as white; and
- (2) When above the approach path, see both units as white; and
- (3) When below the approach path, see both units as red.

FIGURE 1. PAPI SIGNAL PRESENTATION

1.20 General Site Considerations

When viewed from the approach end, the PAPI system shall be located on the left side of the runway. In the event of siting problems, such as conflicts with runways or taxiways, the PAPI may be located on the right side of the runway. The PAPI must be sited and aimed so that it defines an approach path with adequate clearance over obstacles and a minimum threshold crossing height. If the runway has an Instrument Landing System (ILS) glide slope already established, the PAPI is installed as described in 1.3 below so that the visual glide slope will coincide (as much as possible) with the electronic one produced by the ILS. If there is no ILS on the runway, the PAPI glide slope is chosen as described in 1.4 below. Aiming of the light units is described in paragraph 1.50. Other siting tolerances and considerations which are common to all PAPI installations are described in 1.6.

1.30 Siting PAPI on a Runway With an ILS glide slope

When siting the PAPI on a runway with an established ILS glide slope, the PAPI visual approach path should coincide as much as possible with the one produced electronically by the ILS. To accomplish this, the PAPI is placed at the same distance from the threshold as the virtual source of the ILS glide slope within a tolerance of ± 30 feet (± 10 m). The PAPI is aimed at the same angle as the ILS glide slope. For these locations, the distance to the ILS glide slope source plus an additional 300 feet ± 50 , -0 ($90\text{m} \pm 15$, -0).

1.40 Siting PAPI on a Runway Without an ILS Glide slope

When an ILS glide slope is not present, the designer must determine a position and aiming for the PAPI which will produce the required threshold crossing height and clearance over obstacles in the approach area.

1.41 Threshold Crossing Height (TCH)

The TCH is the height of the lowest on-course signal at a point directly above the intersection of the runway centerline and the threshold. The minimum allowable TCH varies according to the height group of aircraft that uses the runway. The PAPI approach path must provide the proper TCH for the most demanding height group that uses the runway.

1.42 Glide path Angle

The visual glide path angle is the center of the on-course zone, and is normally 3 degrees when measured from horizontal. For non-jet runways, this may be raised to 4 degrees if required to provide obstacle clearance. If used, the higher angle must be specified in a Notice to Airmen (NOTAM) and published in the Airport Facility Directory.

1.43 The PAPI Obstacle Clearance Surface

The PAPI obstacle clearance surface is established to provide the pilot with a minimum clearance over obstacles during approach. The PAPI must be positioned and aimed so that no obstacles penetrate this surface. The surface begins 300 feet (90m) in front of the PAPI system (closer to the threshold) and proceeds outward into the approach zone at an angle 1 degree less than the aiming angle of the third light unit from the runway (for a 4-Box), or the outside light unit (for a 2-Box). For a 4-Box with a 3 degree glide path and 20 minute separation between light units, the third light unit from the runway would be aimed at 2 degree 50' elevation. The surface extends 10 degrees on either side of the runway centerline extended, and extends 4 statute miles from its point of origin. If a sit survey determines that there is an obstacle which penetrates the obstacle clearance surface, and cannot be moved, then the glide path angle must be changed or the PAPI system moved further from the threshold. By moving or re-aiming the PAPI, the designer must reposition the PAPI obstacle clearance surface so it will not be penetrated by an obstacle.

1.50 Aiming

After the visual glide path angle has been selected, the PAPI units are aimed to define that path. The standard aiming angles for the 4-Box and the 2-Box systems are shown in Tables 2 and 3 of the FAA CIRCULAR AC 150/5345-28D dtd. 5/23/85, and are reflected in these instructions.

Table 2. Aiming of the (4-Box) PAPI

Relative to a Pre-selected glide path, Chapter 2, par. 20, page 15.

Table 3. Aiming of the (2-Box) PAPI

Relative to a Pre-selected glide path, Chapter 2, par. 20, page 15.

1.60 Other Site Dimension and Tolerances

1.61 Distance From Runway Edge The inboard light unit shall be no closer than 50 feet, +10, -0 (15m, +3, -0) from the runway edge or to other runways or taxiways. This dimension may be reduced to 30 feet (10m) for small general aviation runways used by non-jet aircraft.

1.62 Separation Between Light Units

The PAPI Units shall have a lateral separation of between 20 and 30 feet (6 to 9m) for a 4-Box system because it increases the usable range of the system. For the 4-box system the distance between boxes shall not vary by more than 1 foot (0.3m).

1.63 Azimuth Aiming

Each light unit shall be aimed outward into the approach zone on a line parallel to the runway centerline within a tolerance of $\pm 1/2$ degree.

1.64 Mounting Height Tolerances

The beam centers of all light units shall be within ± 1 inch of a horizontal plane. This horizontal plane shall be within ± 1 foot (0.3m) of the elevation of the runway centerline at the intercept point of the visual glide path with the runway (except for the condition in point 1.67 below).

1.65 Tolerance Along Line Perpendicular to Runway

The front face of each light unit in a bar shall be located on a line perpendicular to the runway centerline within ± 6 inches.

1.66 Correction for Runway Longitudinal Gradient

On runways where there is a difference in elevation between the runway threshold and the runway elevation at the PAPI, the location of the light units may need to be adjusted with respect to the threshold in order to meet the required obstacle clearance and TCH. Where such conditions exist, the following steps are taken to compute the change in the distance from the threshold required to preserve the proper geometry. Please refer to FAA CIRCULAR AC 150/5345-28D CHG 1 dtd. 11/1/91, Figure 3.

- (1) Obtain the runway longitudinal gradient. This can be done by survey or obtained from as-built, drawings or airport obstruction charts.
- (2) Determine the ideal (zero gradient) distance from the threshold in accordance with the instructions above.
- (3) Assume a level reference plane at the runway threshold elevation. Plot the location determined in (2) above.
- (4) Plot the runway longitudinal gradient (RWY)
- (5) Project the visual glide path angle to its intersection with the runway longitudinal gradient (RWY). Then solve for the adjusted distance from threshold either mathematically or graphically.
- (6) Double-check to see that the calculated location gives the desired threshold crossing height.

1.67 Other Site Consideration

- (1) Where the terrain drops off rapidly near the approach threshold and severe turbulence is experienced, the PAPI should be located farther from the threshold to keep the aircraft at the maximum possible threshold crossing height.
- (2) On short runways, the PAPI should be as near the threshold as possible to provide the maximum amount of runway for braking after landing.

- (3) At locations where snow is likely to obscure the light beams, the light units may be installed so the top of the unit is a maximum of 6 feet (2m) above ground level. This may require locating the light units farther from the runway edge to ensure adequate clearance for the most critical aircraft. Since raising the light units also raises the threshold crossing height for the visual glide path, the lights may also have to be relocated closer to the threshold to remain within specified tolerances.

1.70 Sitting the Typical 2-Box System

1.71 Select the Desired Threshold Crossing Height (TCH)

1.72 Select the Desired Visual Approach Angles

Legs for the light box should be cut from 2" EMT to provide for mounting the light box unit so that the center of the lens is at the elevation of the crown of the runway at the RRP.

(1) Siting Station Displaced Toward Threshold

(2) Siting Station Displaced From Threshold

Abbreviations:

DI = ideal (zero gradient) distance from the threshold

RWY = Runway longitudinal gradient

TCH = Threshold Crossing Height

T = Threshold

E = Elevation difference between threshold and

RRP = Runway reference point (where aiming angle or visual approach path intersects runway profile)

D = Adjusted distance from threshold

O = Aiming angle

SECTION TWO

INSTALLATION INSTRUCTIONS

2.00 Installation

The ZA737/757 PAPI systems requires several steps to insure proper installation and maximum performance. These steps should not be bypassed.

- * Determination of proper location of the light boxes.
- * Installation of the footers and mounting pads.
- * Interconnect wiring and home run wiring.
- * Alignment of the light box assemblies.
- * Electrical adjustments.
- * Flight check.

2.10 Determination of Proper Light Boxes

To obtain an optimized approach system, several factors must be considered. These are:

- * What is the distance between the pilot's eyes and the wheel of the largest aircraft to use the runway?
- * What is the desired threshold crossing height?
- * What is the desired glide slope angle?
- * Will the selection of the above parameters satisfy the required obstacle clearance angle?

2.11 For general aviation, small commuters and corporate turbo jets, the wheel-to-eye distance in landing configurations is generally 10 feet or less. The required threshold crossing height (TCH) is the range between 20' minimum and 45' maximum. It must be set high enough that adequate clearance is available to the aircraft when crossing the threshold. However, as the TCH is raised, the runway reference point (RRP) also moves down the runway away from the threshold. Additionally, as the glide slope angle is increased, the RRP moves back towards the threshold. Therefore, you must select the desired TCH, and the desired glide slope, locate these points on the runway, then check whether or not they satisfy the obstacle clearance angle. To test for adequate obstacle clearance, you must take a surveyor's transit to a point 300 feet towards the threshold from the proposed runway reference point, set up the transit on the centerline of the runway at pavement height, adjust the transit for the required obstacle clearance angle, and then look into the approach area at all angles up to 10 degrees each side of the centerline to assure that no obstacle penetrates the obstacle clearance angle. If obstacles do penetrate the obstacle clearance angle, then either the TCH must be increased, or the glide slope must be increased to clear the obstructions.

NOTE:

If nearby trees are an obstacle to your approach, allowances should be made in sitting your system, because the trees will continue to grow and could become a serious hazard.

2.12 The tabulation of glide slope angle vs. TCH will assist in optimizing the approach and RRP.

2.13 After suitable RRP and the glide slope angle are determined, the PAPI light box location indicated on the tabulation will be satisfactory provided the mounted height of the light boxes will be at an elevation equal to the elevation of the crown of the runway at the RRP +/- 1 foot. If the elevation restriction cannot be maintained, the location of the light boxes should be moved closer to or away from the threshold, in order to maintain the same RRP. The boxes should be moved up or down the runway according to the tabulation for "deviation of the light box height vs. deviation of the light box position".

2.20 Installation of Footers and Mounting Pads

Once the elevation and exact physical location of the light boxes has been determined, footers should be prepared as depicted in drawing 6020262 (attached). After the footers have been set up, the EMT (2") legs should be cut. Because of the legs and mounting hardware, 16" is the minimum height that the center of the light box will be above the mounting surface. To determine the length to cut the EMT legs, subtract 11.25" from the height of the proposed mounting center of the light box lens, above the mounting pad. Mount the light boxes and power supply on the pads.

2.30 Interconnect Wiring and Home Runs

2.31 The home run wiring size should be carefully selected to insure optimum performance of the system. Select the size as indicated by plans and specifications. If the transformer(s) is (are) located within 30' of the light box, #10 wire is adequate for the lamp circuit, and #16 wire is adequate for the tilt switch circuit.

2.32 To protect the wiring between the light box assembly and the point at which it goes underground, 1" watertight flex duct is a good selection. It can be terminated in a 1" conduct (pipe) sweep to interface to the trench.

2.33 Wiring Connections

- * Connect a ground rod ground to each light box assembly's ground lug at TB1.
- * Connect two 200 watt isolation transformers to each light housing assembly's TB1 (PWR connection) using the supplied harness assembly and the one inch (1") liquid tight (LT) kit. Five feet of flexible duct has been provided for each box along with two LT connectors, and one (1) 2" to 1" reducer. Please refer to drawing FLP28403B or FLP28403F (attached).

CAUTION!

Insure the series lighting circuit has been disabled and safety interlocks are applied before attempting this step!

- * Connect the tilt circuit while referring to drawing FLP28403B (attached).

2.40 Adjustment of the Light Box Assemblies.

The Aiming Device consists of precision machined aluminum blocks corresponding to the particular angles required by Glide Slope and number of boxes. There are 5 blocks for a four box system and 3 blocks for a two box system with standard Glide Slope of 3

degrees. Non standard Glide Slopes will require special sets of aiming blocks. The Aiming Blocks are designed to be set on the edge of the light box with the provided spirit level on the top surface. Refer to Figs. 1 & 2



Figure 1 - Aiming device positioning.

2.41 L-881 (two box system)

The light box assembly nearest the runway should be adjusted to the glide slope angle + 1/4 degree (+15 minutes). The light box assembly farthest from the runway should be adjusted to the glide slope angle - 1/4 degree (-15 minutes). When the boxes are in place, make sure both are adjusted with the adjustment jacks so that the center of the lens of the boxes are at the same elevation. Remove the cover from the light box assembly.

For horizontal alignment place the 6" spirit level across the light box, either on the lens housing or reflector housing. Adjust the forward nuts on the adjustment jacks to bring the spirit level to center.

HINT!

For each 1/4 turn executed on the nut on one side, turn the nut on the other side 1/4 turn in the opposite direction. This will keep the lens center at the same elevation at all times during adjustment. Recheck both points.

Position the proper aiming block on the edge of the light box for vertical alignment. Place the spirit level on the aiming block. Adjust the both rear adjustment jacks to bring the spirit level to center. Next, tighten the bolts holding the pivots. These are accessible underneath the unit at the forward corners.

Recheck the horizontal adjustment at points at each corner and adjust as required. Tighten all nuts securely.

Recheck the vertical adjustment, then tighten all nuts on the new pivot. Last, place the level on top of the tilt switch. Adjust the tilt switch until the spirit level is centered. Tighten the bolts to hold the tilt switch secure. Replace the cover on the light box assembly.

2.42 L-880 (four box system)

The light box assembly nearest the runway should be adjusted to the glide slope angle + 1/2 degree (+30 minutes). The next adjacent light box assembly should be adjusted to the glide slope angle + 1/6 degree (+10 minutes). The next adjacent light box assembly should be adjusted to the glide slope angle - 1/6 degree (-10 minutes). The next adjacent light box assembly should be adjusted to the glide slope angle - 1/2 degree (-30 minutes). When the boxes are in place, make sure both boxes are adjusted with the adjustment jacks so that the center of the lens of all boxes are at the same elevation. Remove the cover from the light box assembly. For horizontal alignment place the 6" spirit level across the light box, either on the lens housing or reflector housing. Adjust the forward nuts on the adjustment jacks to bring the spirit level to center.

HINT!

For each 1/4 turn executed on the nut on one side, turn the nut on the other side 1/4 turn in the opposite direction. This will keep the lens center at the same elevation at all times during adjustment. Recheck both points.

Position the proper aiming block on the edge of the light box for vertical alignment. Place the spirit level on the aiming block. Adjust the both rear adjustment jacks to bring the spirit level to center.



Figure 2 - Spirit level placed on aiming device.

Next, tighten the bolts holding the pivots. These are accessible underneath the unit at the forward corners.

Recheck the horizontal adjustment and adjust as required. Tighten all nuts securely.

Recheck the vertical adjustment, then tighten all nuts on the new pivot. Last, place the level on top of the tilt switch. Adjust the tilt switch until the spirit level is centered. Tighten the bolts to hold the tilt switch secure. Replace the cover on the light box assembly.

2.50 Color filter and lamp installation.

When installing the color filters, as viewed from the rear, select the indicated serial numbered filter set and install so that “TCR” is positioned top, center, (toward the center of the light box) and to the rear. This is marked on each color filter. Next, install 50-J1/39 lamps into each light box assembly’s lamp holder.

After each light box assembly has been properly aligned, and the tilt switches properly set, the system is ready to be turned on. Energize the constant current regulator. The lamps in all Light Housing Assemblies should now be ‘ON’.

CAUTION!

Do not look directly into the front of the light box because the light beam is very intense at that point.

2.60 Flight Check

Before placing in service, the system should be thoroughly flight checked. The flight check should include flying over any and all obstructions in the approach area to be sure that all light boxes show red whenever you are close to the obstructions. Several normal approaches should be made to insure good signal at all points in the approach path.

SECTION THREE

SYSTEM DESCRIPTION

3.00 Principle Components

The model ZAZ757 PAPI ‘B’ Style system consists of the following principle components:

Light Box Assemblies (Qty 4 for L880; 2 for L881)

4 or 2 ea. - Power harness and LT kits.

1 lot - Mounting Hardware

1 ea. - Aiming Device with precision 6" Spirit Level. A protective case is included with each device.

3.10 Light Box Assembly

The light box assembly is stable optical platform which supports the lamp, reflector, lenses, color filter, and tilt switch. Light from the lamp is collected and focused into the plano-convex lens set. This combination produces the field of illumination into the approach area. Concurrent with the illumination, a red filter is so located that it is at the focal point of the plano-convex lens set as one would view the light box from the approach area. The transition zone is factory adjusted so that it agrees with the calibrated scale on the alignment arrow assembly. When the light box assembly is being adjusted, the process elevates the front of the light box assembly so that the transition zone is set to the desired angle of inclination (alignment angle). It is extremely important that when the light box assembly is aligned in the field, all bolts and nuts are tightened properly, then alignment rechecked to insure accuracy.

3.20 Power

System power is supplied by a series circuit energized by a constant current regulator and eight (8) or four (4) 200 watt isolation transformers for the L-880 and L-881 systems respectively. It is controlled by printed circuit boards located in each light housing assembly. Each system consists of one primary PCB and one or three secondary units. Each system **MUST** have a primary which can be identified because it contains the only transformer. Secondaries do not have transformers.

3.30 Day/Night Control

Since the system is powered by a series circuit constant current regulator, lamp intensity is selected and controlled by tower operation personnel.

3.40 Power Regulation Circuit

Power regulation is dependent upon the constant current regulator. Consult the manufacturer's technical manual for all information.

3.50 Tilt Detection Circuit

To insure aircraft safety by preventing out-of-alignment systems from operating, a tilt detection circuit has been incorporated. This circuit utilizes a time delay feature to screen out false signals due to vibrations in normal operation with a closed tilt switch loop. Should the tilt circuit fail, the system will de-energize after a period which was factory adjusted to 20 seconds. At no time should this or any other safety feature be bypassed or modified. To do so will risk aircraft safety.

3.60 Lens Heater Circuit, Class II only

In severe winter climates, the lens must be heated to insure dependable operation in all weather conditions. This is accomplished by a power resistor in series with each lamp filament. It dissipates approximately 20 watts into its heater mount; this insures complete lens heat absorption and dependable signal presentation to pilots.

3.70 Alignment & Aiming Device Calibration

This component has two parts. The structural component shown in Figure 2 has no calibration. It has been factory checked for accuracy and cannot be altered without damage to the frame. The adjustable precision spirit level is shown in Figure 3. The level was factory aligned and should not require adjustment, but if this were ever necessary, the check and alignment is quite simple:

- A. Use any flat level surface - the more level and stable the better. Insure the surface is clean, and that the bottom of the level is also clean.
- B. Place the level on the inspected area, marking its location. Now, reverse the level (turn it 180 degrees). The bubble **MUST** be in the same relative position on the scale.
- C. With each movement of the level, give the bubble time to become stable.
- D. Should the bubble **NOT** be in the same relative position, loosen the adjustment nuts and correct for **one-half** of the difference in the readings. Re-tighten the nuts. Repeat steps B, C, and D until there is no difference. This completes the Alignment and Aiming Device's calibration. It should be accomplished before each use, or at least semi-annually.

SECTION FOUR

TROUBLESHOOTING

4.00 Troubleshooting

Very few problems will occur with your system. However, in the case of problems, the following pointers will help you locate and correct the problems. It is assumed that all interconnect wiring is good and that tilt switches are aligned and have continuity.

CLASS I or CLASS II

Symptom	Likely Problem
Lamp 'OUT'	Check lamp (if either lamp burns out, it would not shut off the other lamp).

CLASS II ONLY

Lamp still not 'ON'	Temporarily short TB1B, R1-1 and R1-2, then R2-1 and R2-2. As each is tested, if the failed lamp turns 'ON', the heater resistor may have failed. Check for .5 ohm resistance - replace if required.
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CLASS I or CLASS II

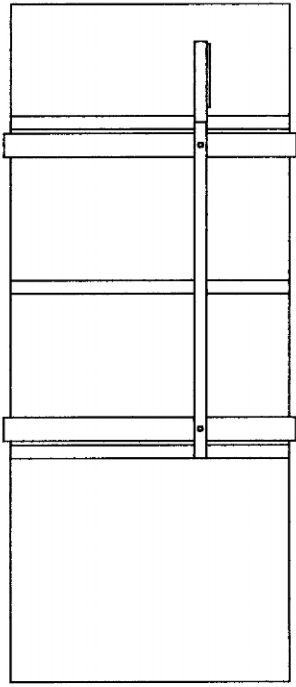
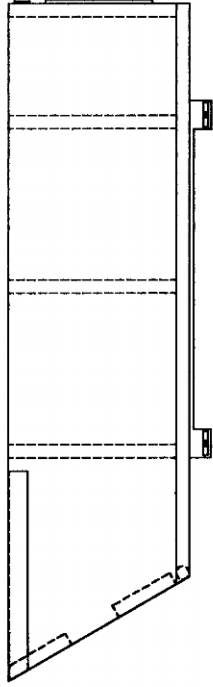
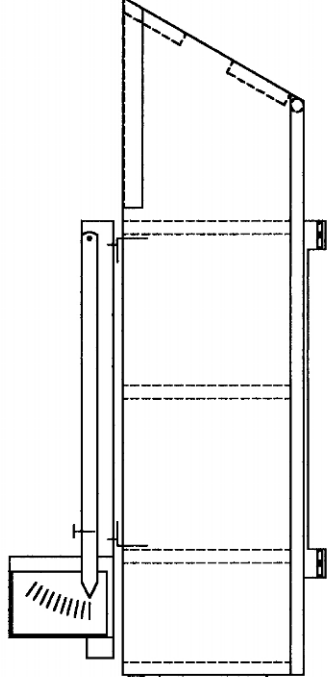
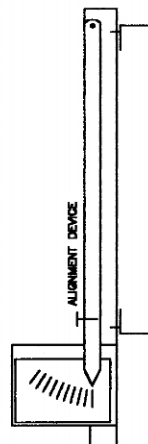

All lamps will not turn 'ON' **L-880 System** (four [4] box)

Temporarily short TB1A, T-1 and T-2 on the **PRIMARY** unit. Only its lamps should be 'ON'. If not, check continuity of tilt switch. If OK, replace the **PRIMARY** control board. If the **PRIMARY** is OK, repeat the procedure on each **SECONDARY** unit. If lamps energize in all **OTHER** units, replace **THAT SECONDARY** control board.

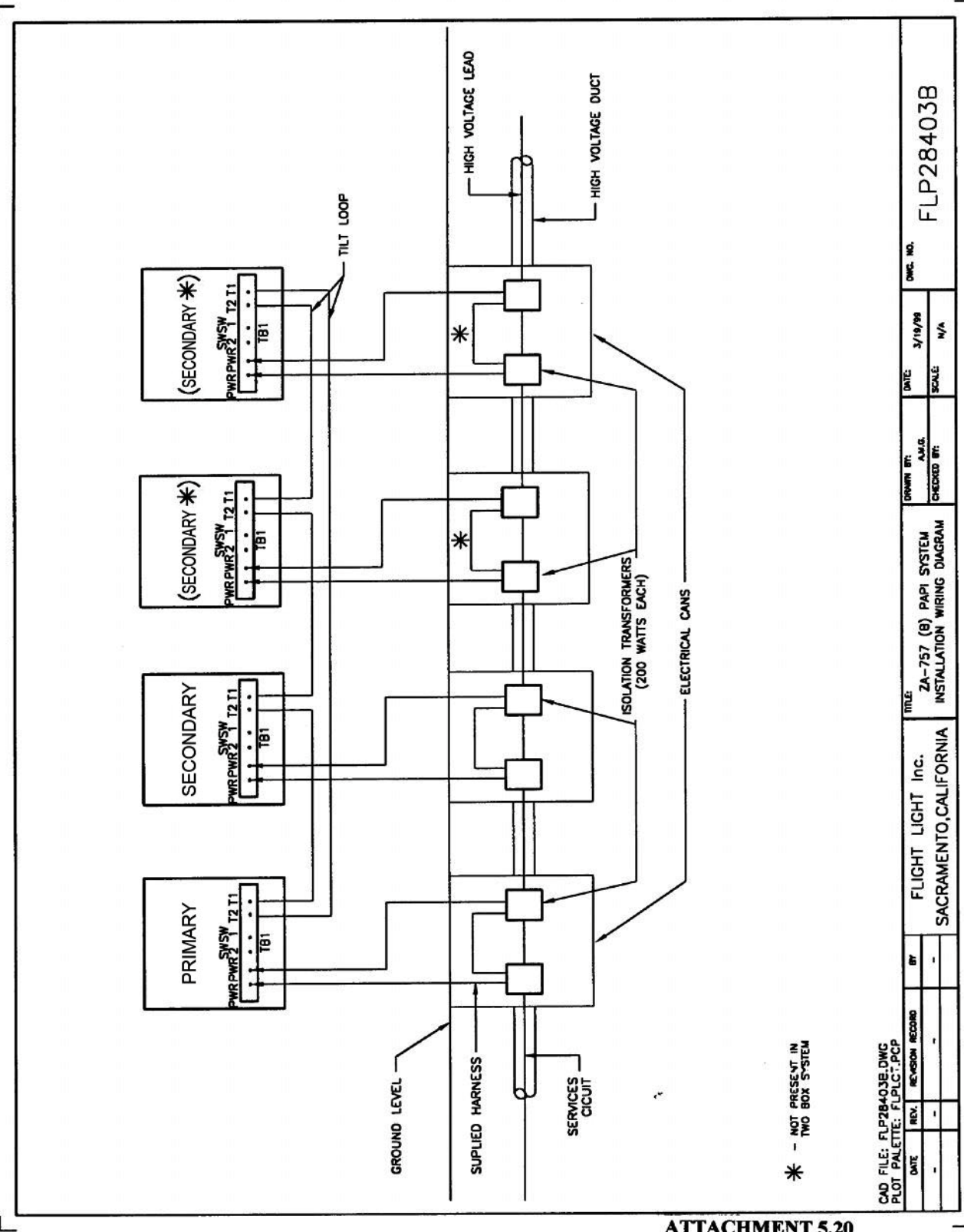
If problem is determined to be a particular tilt switch, readjust tilt switch by going through zero and then back.

DO NOT LEAVE JUMPER(S) IN PLACE!

Light Box Alignment	Footers not stable. Mounting hardware is not tight. Check floor flanges, nuts on frangible couplings, bolts & nuts on light box.
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										<p>CAD FILE: FLP28402.DWG PLOT PALETTE: FLPLOT.PCP</p>		<p>DATE: -</p>		<p>REV: 1</p>		<p>REVISION RECORD</p>		<p>BY: -</p>		<p>FLIGHT LIGHT Inc. SACRAMENTO, CALIFORNIA</p>		<p>TITLE: ZA 757/737 ALIGNMENT GUIDE</p>		<p>DRAWN BY: M.F.B. CHECKED BY: TONY SWANER</p>		<p>DATE: 3/15/08 SCALE: N.T.S.</p>		<p>DWG. NO. FLP28402</p>	
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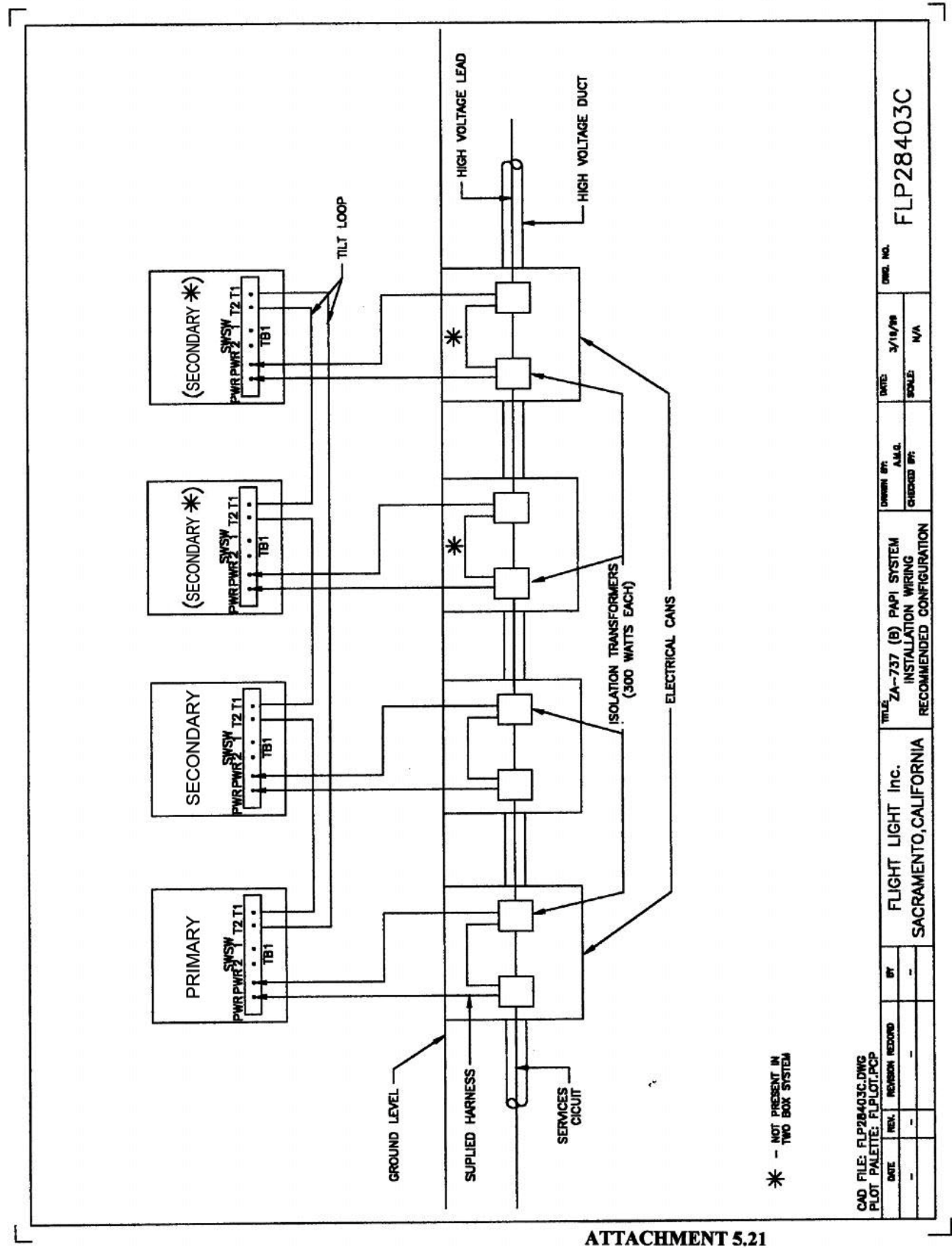
ATTACHMENT 5.10



ATTACHMENT 5.20

CAD FILE: FLP28403B.DWG
PLOT PALETTE: FLP1.CT.PCP

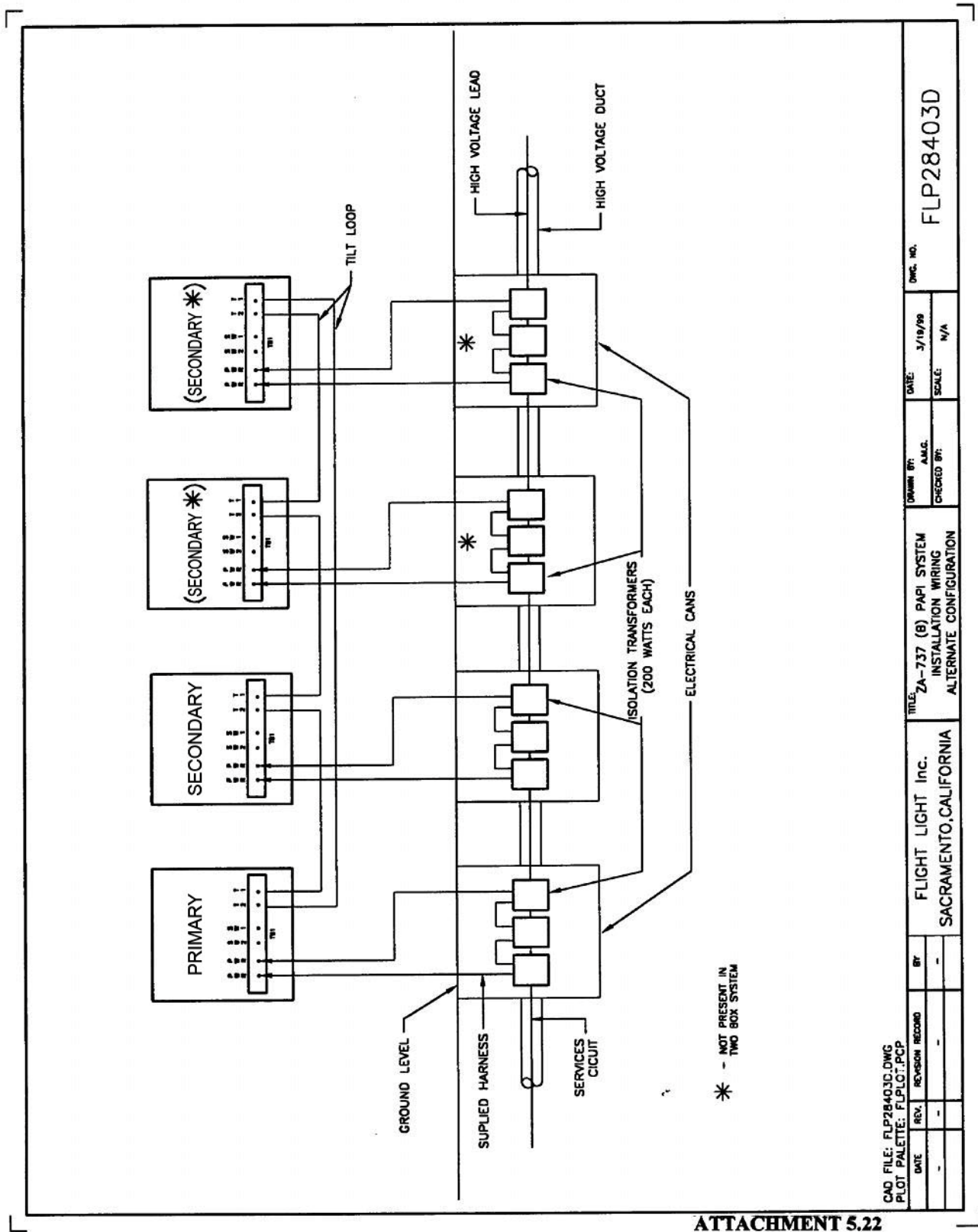
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-		-	-	-	FLIGHT LIGHT Inc. SACRAMENTO, CALIFORNIA		AM/S		3/19/98	N/A		FLP28403B
					ZA-757 (8) PAPI SYSTEM INSTALLATION WIRING DIAGRAM		CHECKED BY:					



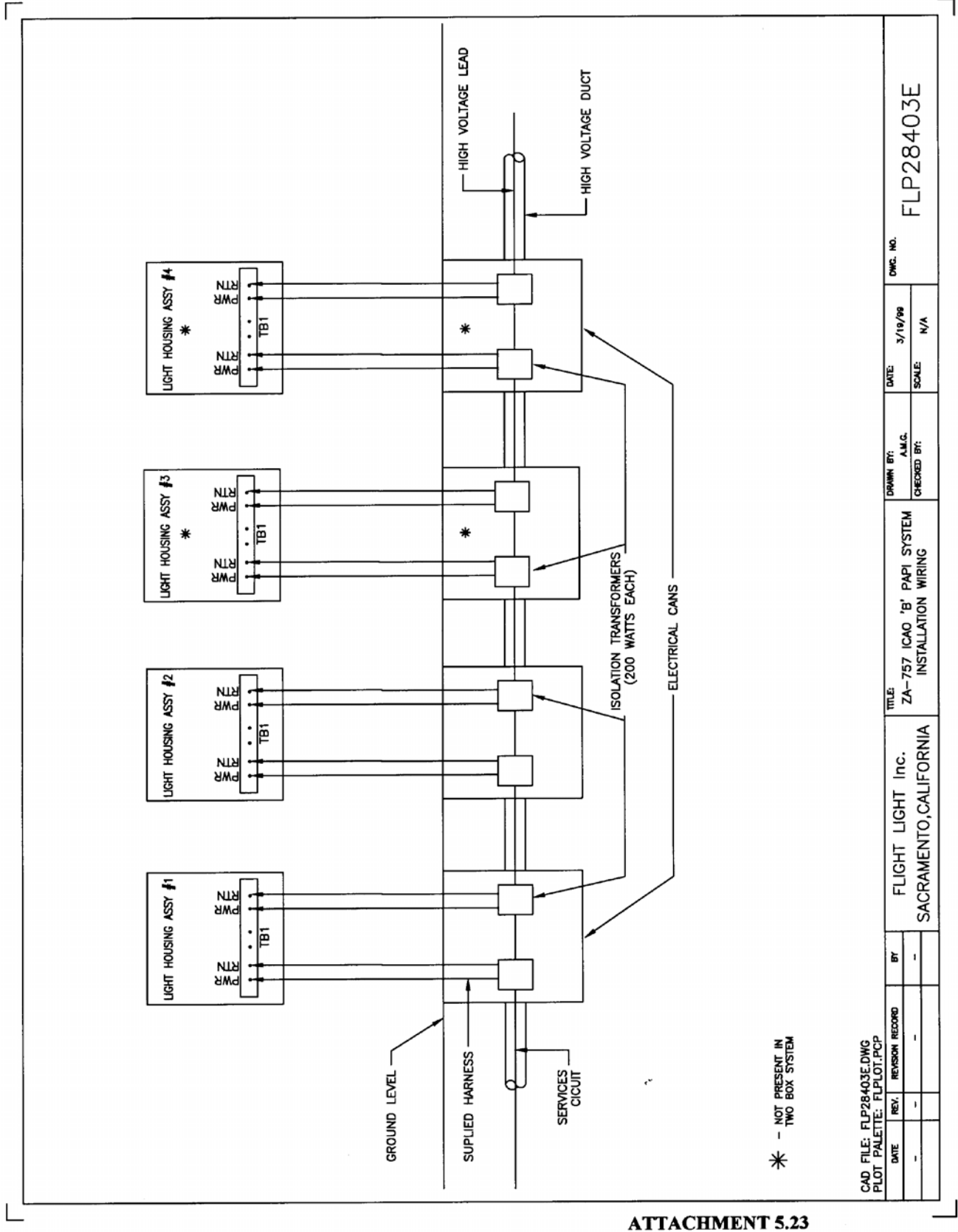
ATTACHMENT 5.21

CAD FILE: FLP28403C.DWG
PLOT PALETTE: FLPLOT.PCP

DATE	REV.	REVISION	RECORD	BY	FLIGHT LIGHT Inc. SACRAMENTO, CALIFORNIA	TITLE ZA-737 (B) PAPI SYSTEM INSTALLATION WIRING RECOMMENDED CONFIGURATION	DRAWN BY A.M.G.	CHECKED BY	DATE 3/14/98	SCALE N/A	DWG. NO. FLP28403C
-	-	-	-	-							



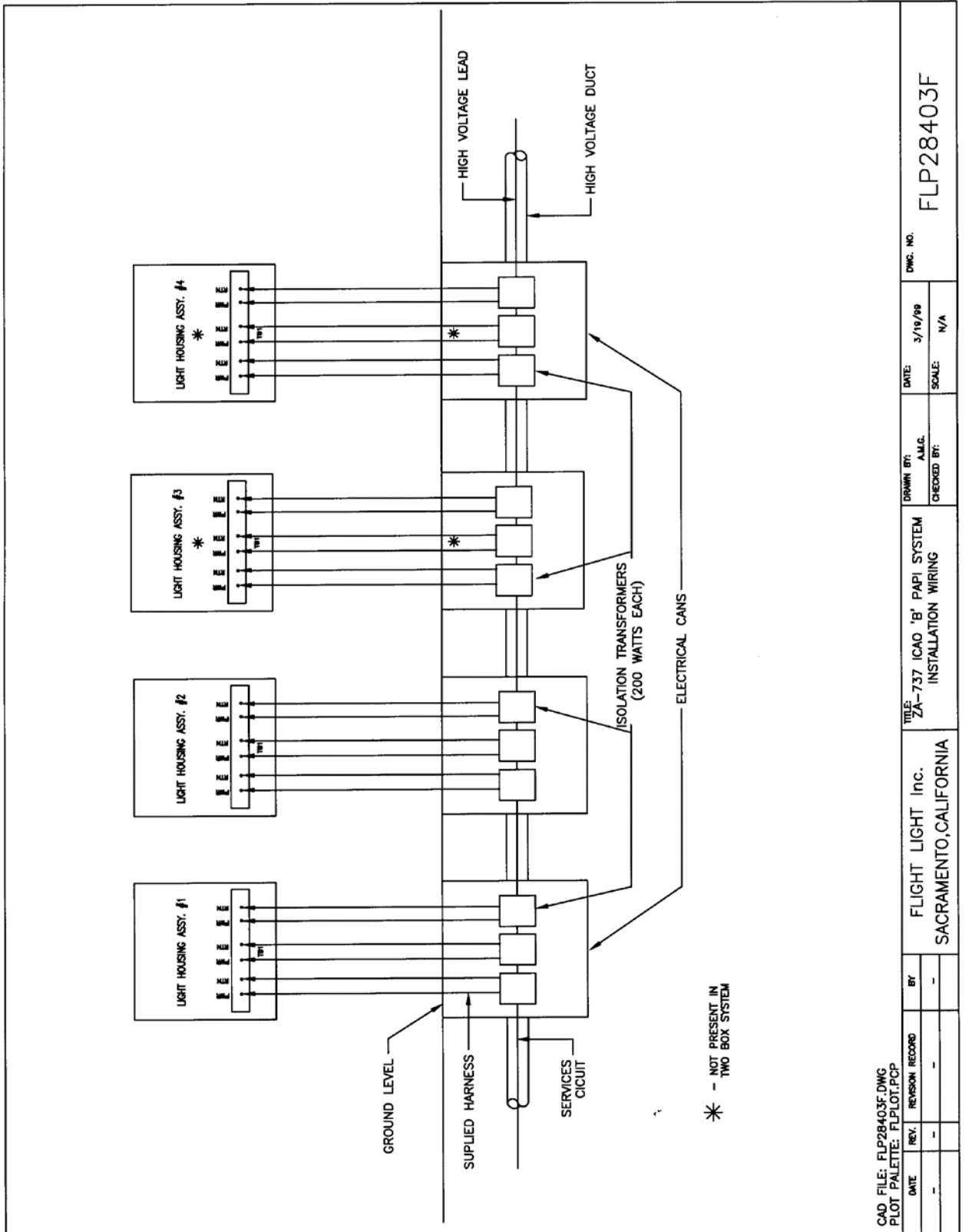
ATTACHMENT 5.22



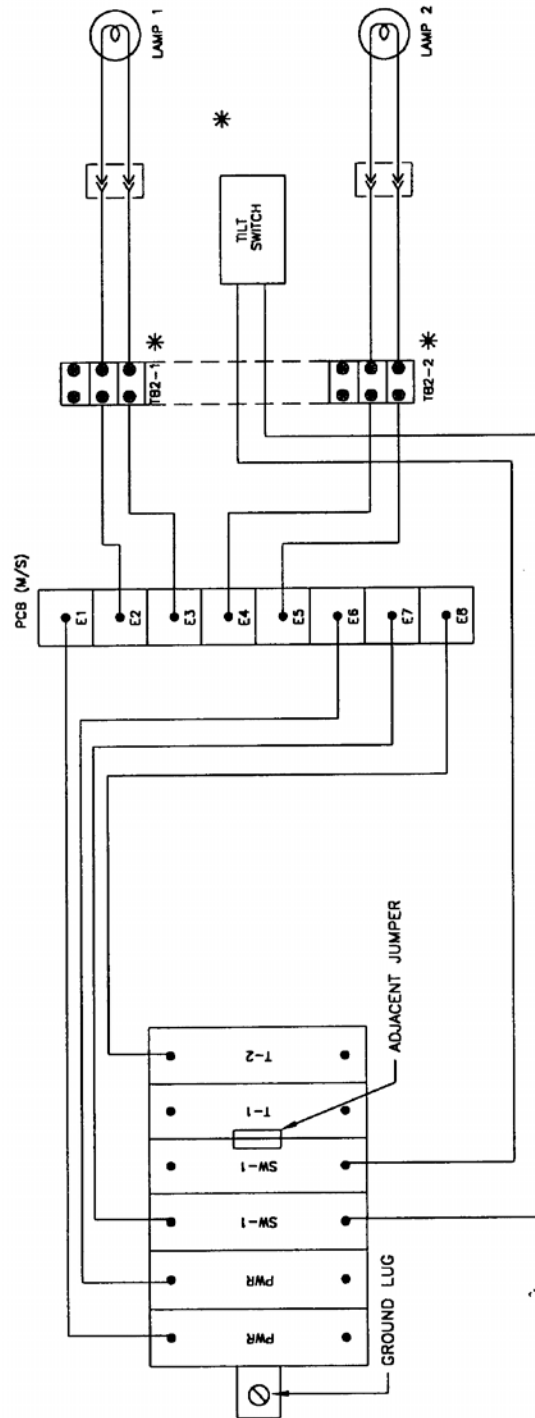
ATTACHMENT 5.23

CAD FILE: FLP28403E.DWG
PLOT PALETTE: FLPLOT.PCP

DATE	REV.	REVISION RECORD	BY	TITLE	DATE	SCALE	DATE	DWG. NO.
-	-	-	-	FLIGHT LIGHT Inc. SACRAMENTO, CALIFORNIA	3/19/98	N/A	3/19/98	FLP28403E
				ZA-757 ICAO 'B' PAPI SYSTEM INSTALLATION WIRING				
					DATE	SCALE	DATE	DWG. NO.
					3/19/98	N/A	3/19/98	FLP28403E



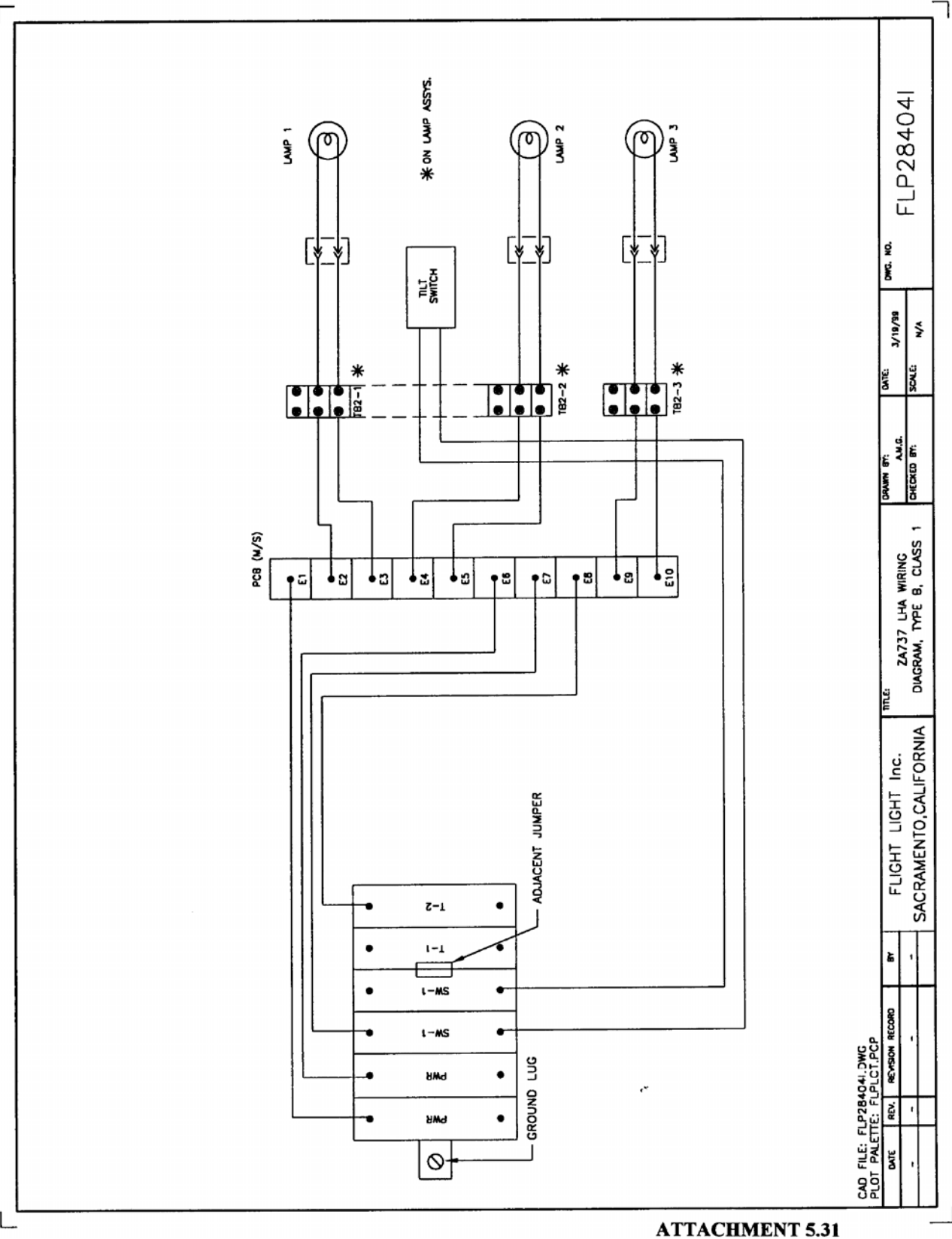
ATTACHMENT 5.24



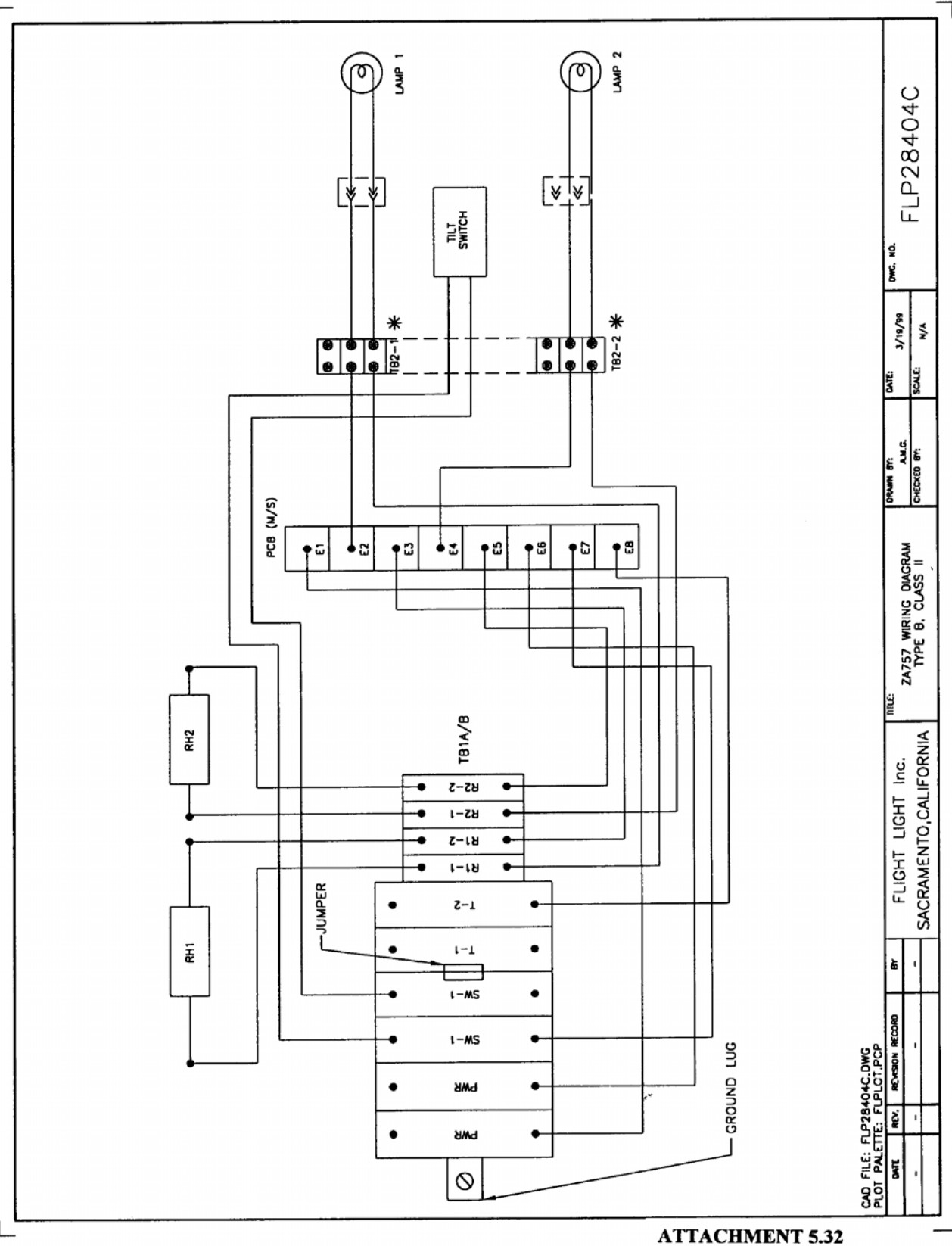
CAD FILE: FLP28404B.DWG
 PLOT PALETTE: FLPLOT.PCP

DATE	REV.	REVISION RECORD	BY	TITLE	DATE	SCALE	DWG. NO.
-	-	-	-	FLIGHT LIGHT INC. SACRAMENTO, CALIFORNIA	3/19/99	N/A	FLP28404B
				ZA 757 LHA WIRING DIAGRAM, TYPE B, CLASS 1			
				DRAWN BY: A.M.G.			
				CHECKED BY:			

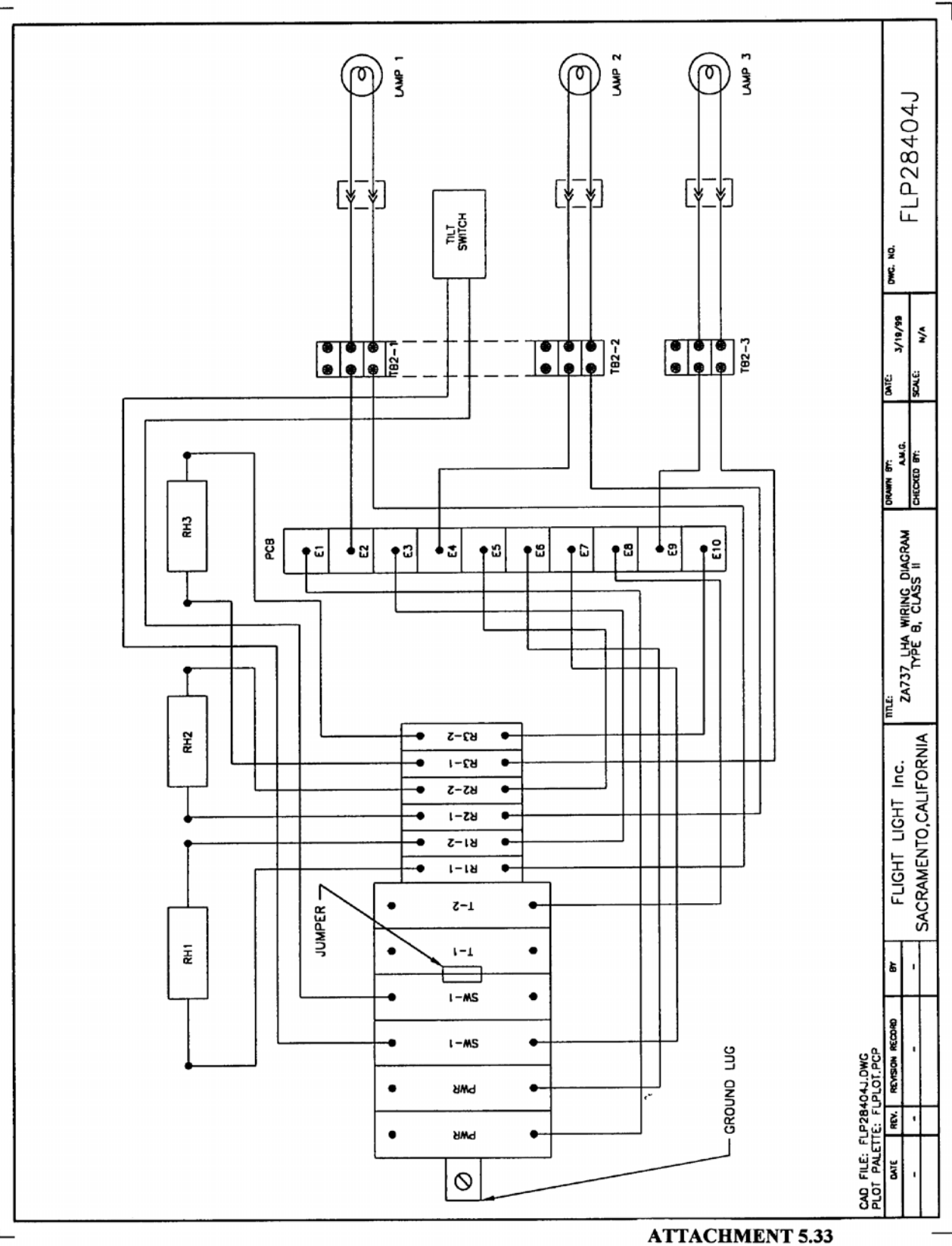
ATTACHMENT 5.30

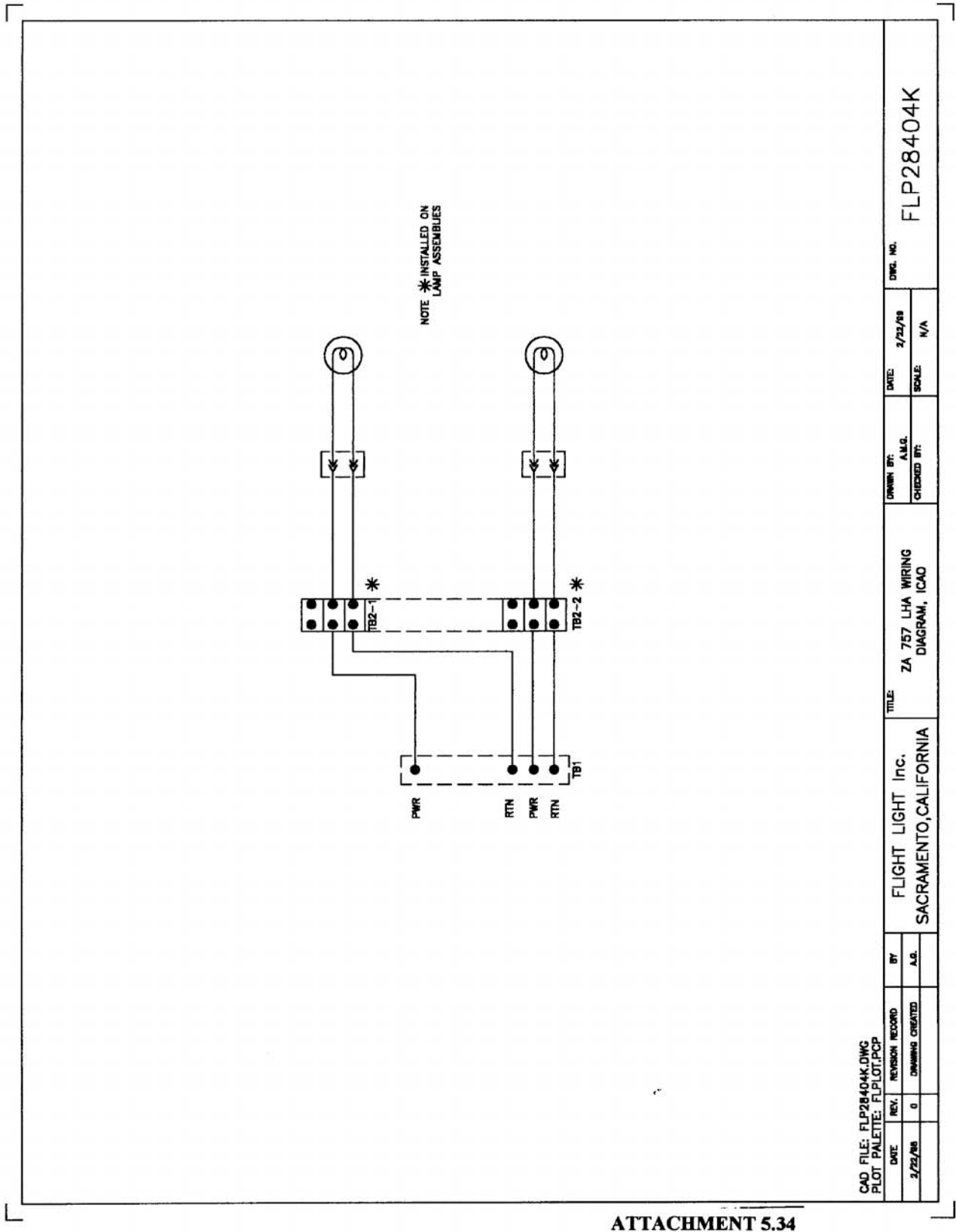


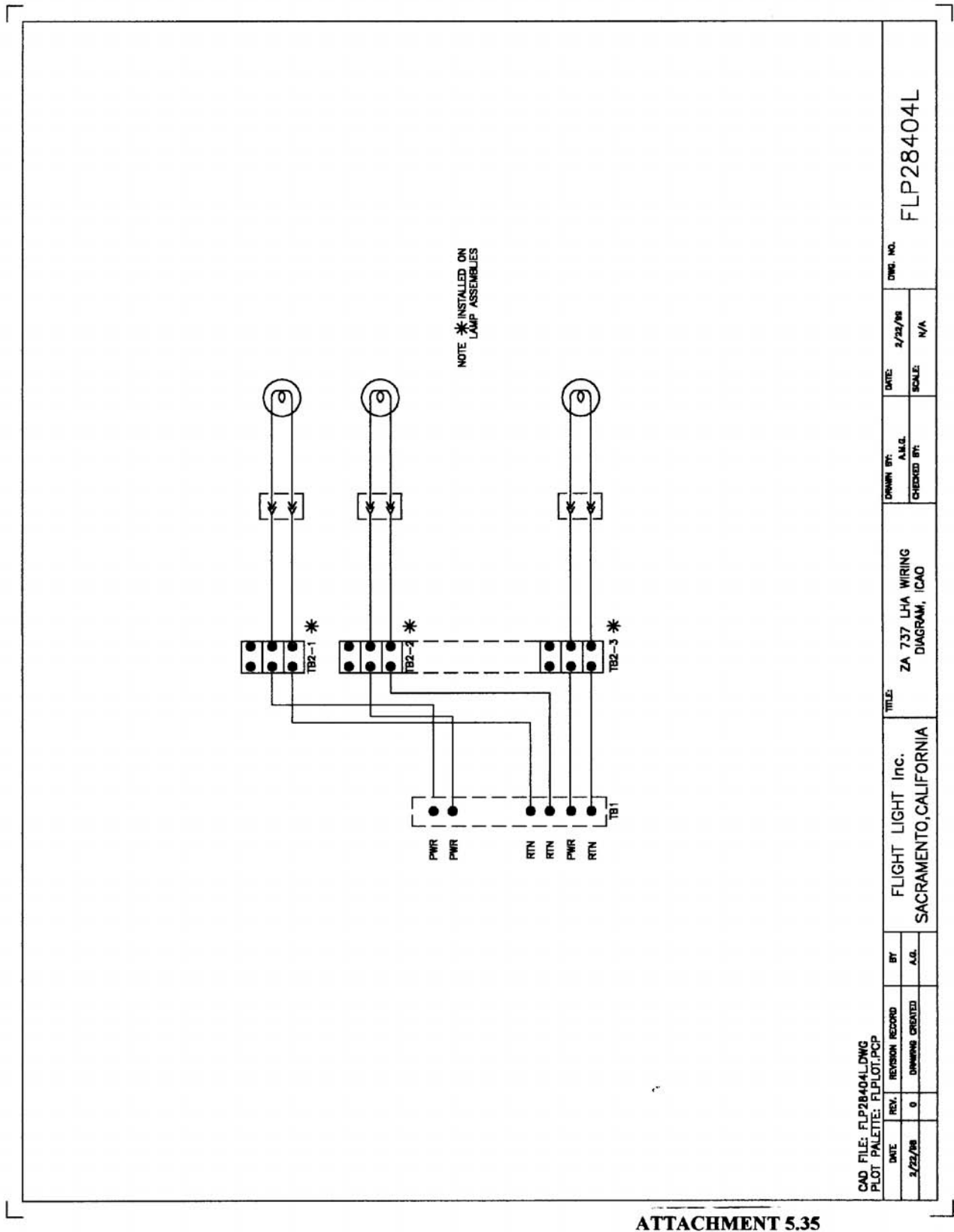
ATTACHMENT 5.31

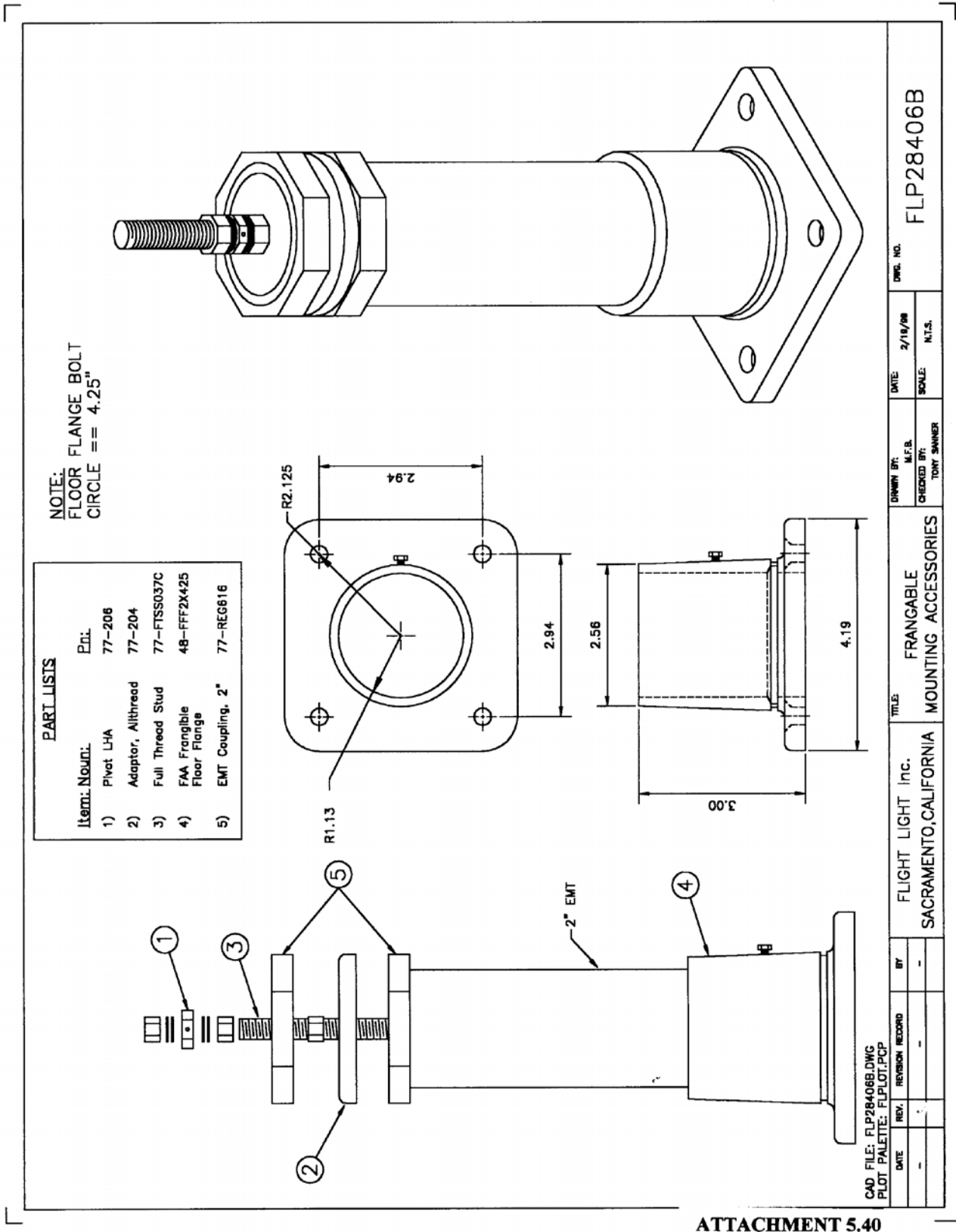


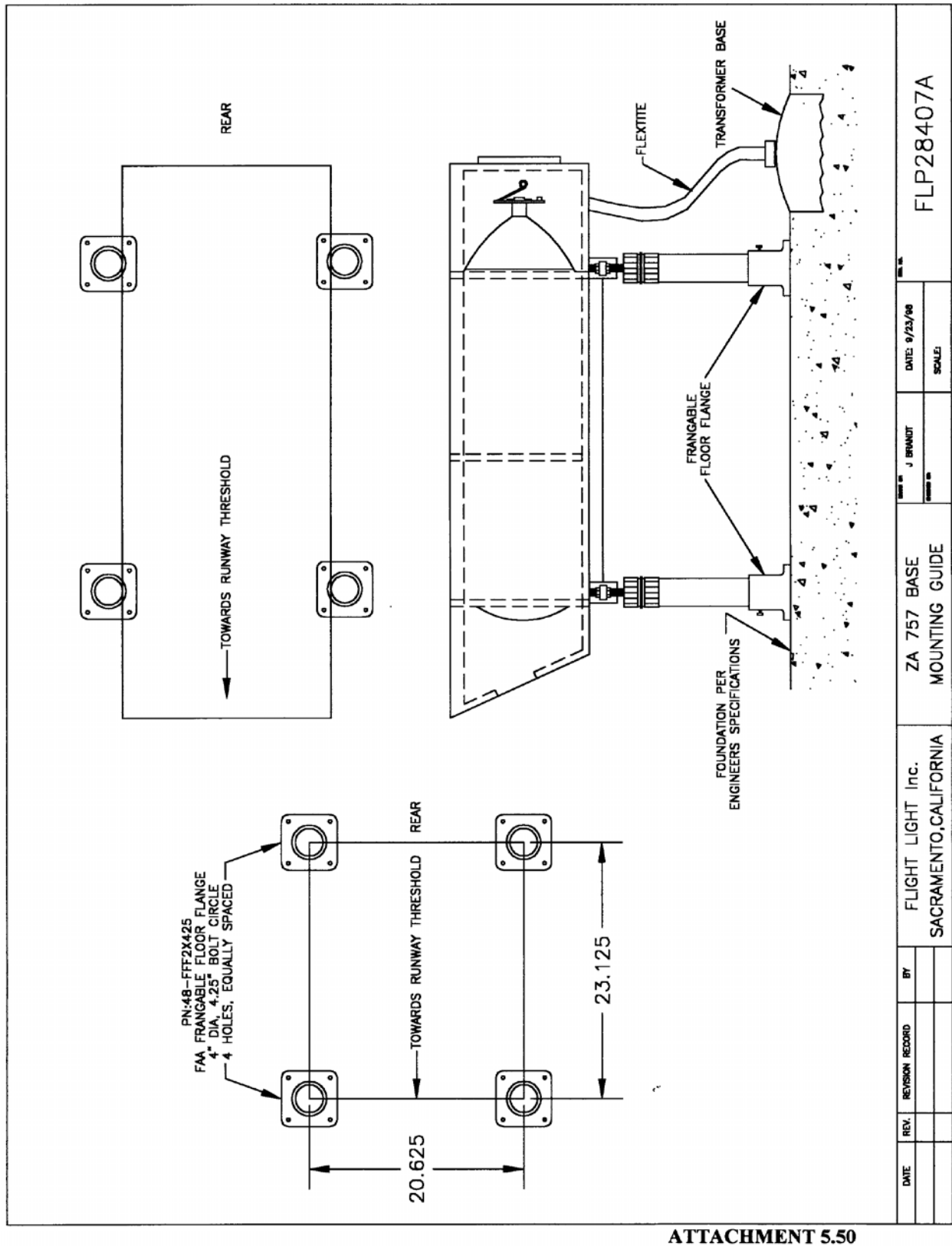
ATTACHMENT 5.32

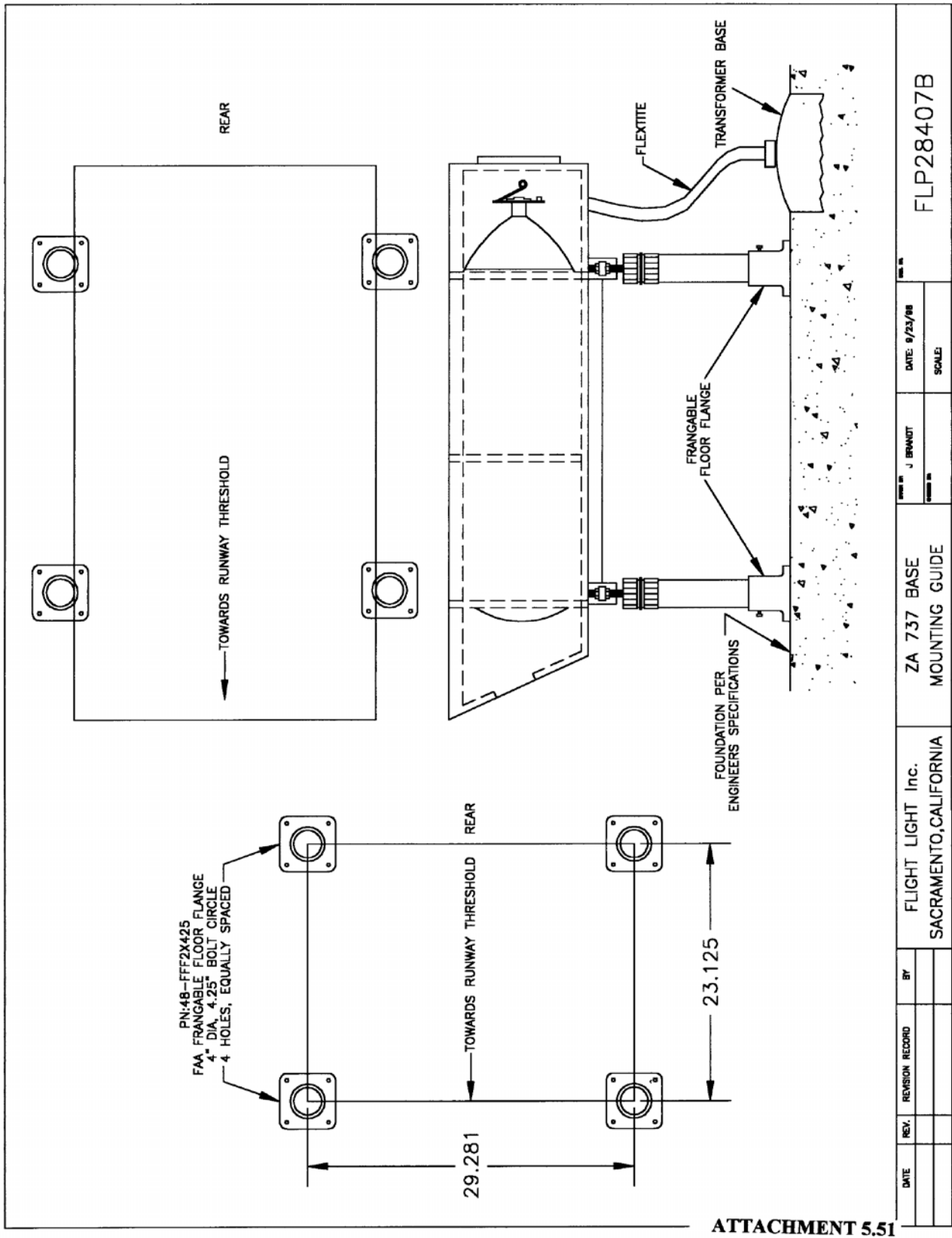




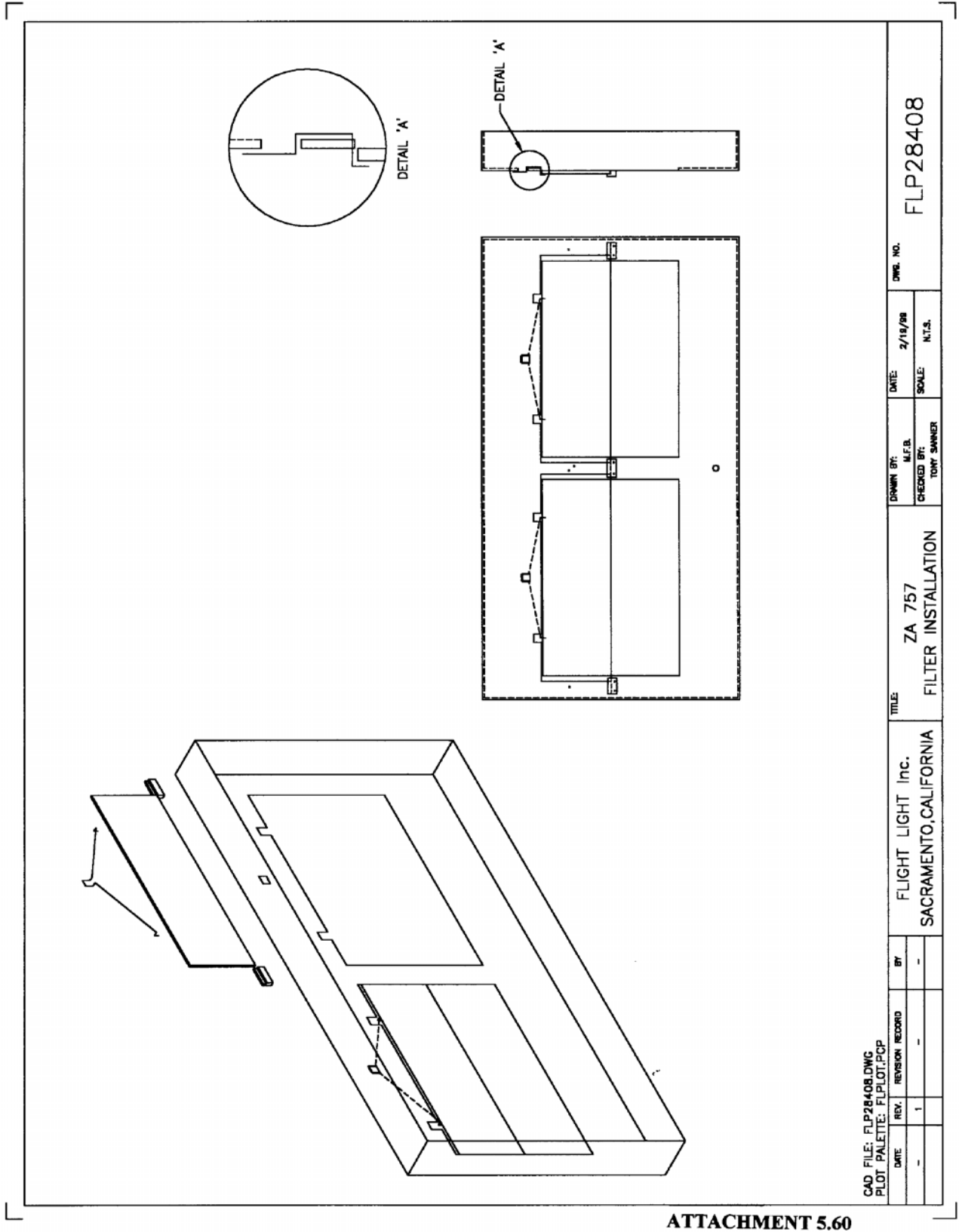








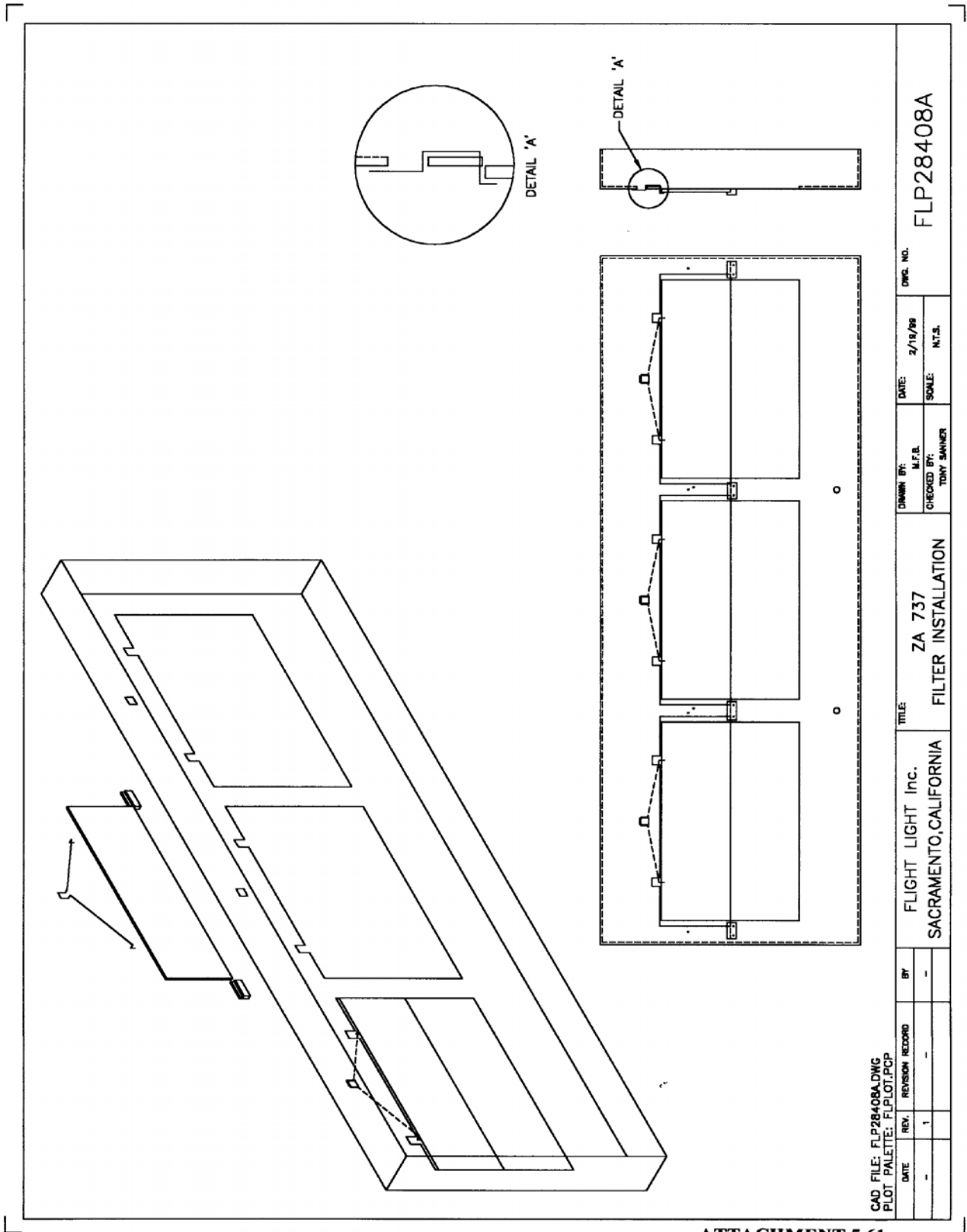
ATTACHMENT 5.51



CAD FILE: FLP28408.DWG
PLOT PALETTE: FLPILOT.PCP

DATE		REV.	1	REVISION RECORD	BY	FLIGHT LIGHT Inc. SACRAMENTO, CALIFORNIA	TITLE: ZA 757 FILTER INSTALLATION		DRAWN BY: M.F.B.	CHECKED BY: TONY SUMNER	DATE: 2/19/08	DWG. NO. FLP28408
-		-			-						SCALE: N.T.S.	

ATTACHMENT 5.60



CAD FILE: FLP28408A.DWG
PLOT PALETTE: FLPLOT.PCP

DATE	REV.	REVISION	RECORD	BY
-	1	-	-	-

FLIGHT LIGHT Inc.
SACRAMENTO, CALIFORNIA

ZA 737
FILTER INSTALLATION

DRAWN BY: M.F.B.
CHECKED BY: TONY SANNER

DATE: 2/19/98
SCALE: N.T.S.

DWG. NO.

FLP28408A

ATTACHMENT 5.61

FLIGHT LIGHT/CEGELEC
ZA737/757 PAPI Style A and B
Parts List

Flight Light PN	Description
15-ZA7X7LHA-X	PAPI Light Housing Assy. A, I/II, Tilt Switch
Components:	
48-FFF2X425	FAA Frangible Floor Flange
50-J1/39	200W 6.6A Quartz G6.35
77-016141	Duct, LT, 1" metallic
77-201	Tilt switch, housing
77-202	Mercury switch, housing
77-203	Tilt switch mounting plate
77-204	Adapter, all-thread
77-206	Pivot, LHA
77-207	Filter holder
77-249-117	End stop
77-282-402	Jumper, adjacent
77-282-601	Terminal block, gray, .315"
77-AS412A1	Switch, mercury
77-HC83314	Catch, stainless steel
77-HS83314SS	Strike, stainless steel
77-REG5803-S	Connector, 1" LT metallic, ins.
77-REG616	EMT coupling, 2"
77-REG8413	Reducer, 2" to 1"
80-015053	ZA757/4 lampholder assembly
80-016045	ZA757/4 lens assembly
80-019035	ZA757/4 filter glass, red
80-021077	Hatch cover
80-021253	ZA757/4 filter spring
80-021254	ZA757/4 reflector assembly
Lens heater Class II	
77-215	Lens heater mount
77-281-604	Terminal block, blue, .236"
77-821-402	Jumper
77-RH25.47	Resistor, 25W, .47 ohm
15-7X7LHA-X	PAPI Light Housing Assy. B, I/II, Tilt Switch
Components:	
48-FFF2X425	FAA Frangible Floor Flange
50-J1/39	200W 6.6A Quartz G6.35
77-016141	Duct, LT, 1" metallic
77-201	Tilt switch, housing
77-202	Mercury switch, housing
77-203	Tilt switch mounting plate
77-204	Adapter, all-thread
77-207	Filter holder
77-249-117	End stop
77-282-402	Jumper, adjacent
77-282-601	Terminal block, gray, .315"
77-AS412A1	Switch, mercury
77-FA130-01	Printed circuit assembly, master (2 lamp)
77-FA130-02	Printed circuit assembly, slave (2 lamp)
77-FA9812101	Printed circuit assembly, master (3 lamp)
77-FA9812102	Printed circuit assembly, slave (3 lamp)

ATTACHMENT 6.00

FLIGHT LIGHT/CEGELEC
ZA737/757 PAPI Style A and B
Parts List

77-HC83314	Catch, stainless steel
77-HS83314SS	Strike, stainless steel
77-REG5803-S	Connector, 1" LT metallic, ins.
77-REG616	EMT coupling, 2"
77-REG8413	Reducer, 2" to 1"
80-015053	ZA757/4 lampholder assembly
80-016045	ZA757/4 lens assembly
80-019035	ZA757/4 filter glass, red
80-021077	Hatch cover
80-021253	ZA757/4 filter spring
80-021254	ZA757/4 reflector assembly
Lens heater Class II	
77-215	Lens heater mount
77-281-604	Terminal block, blue, .236"
77-821-402	Jumper
77-RH25.47	Resistor, 25W, .47 ohm
15-ZA7X7XBPA	ZA7X7 2 and 4 box Power Adapter
Components	
48-FFF2X425	FAA Frangible Floor Flange
77-282-601	Terminal block, gray, .315"
77-15648U	Circuit breaker, 2 pole, 15 Amps, 240 VAC
77-153-0609	Meter, true RMS, 0-10 Amps, 2%
77-213	Enclosure, NEMA 3R, 8"x24"x24"
77-214	Panel, 24"x24"
77-28981	Label, Voltage Warning
77-249-116	End stop
77-249-117	End stop
77-280-313	End plate
77-280-402	Jumper, adjacent
77-280-503	Terminal block w/arrester (Modified)
77-AC120L	Surge arrester, lightening, 20K amps
77-280-641	Terminal block, gray, .197"
77-281-317	End plate
77-281-604	Terminal block, gray, .315"
77-282-317	End plate
77-282-402	Jumper, adjacent
77-282-409	Jumper, alternate
77-W199AX-15	Relay, contactor, 30 amps DPDT, 240 VAC
77-777-310	Tool, for WAGO terminal blocks
77-91115A565	Standoff, SS, 1 1/2" X 1/4" 4-40 hex
77-H050-TB	Hub, raintight
77-RTE-P21	Timer, D-O-B, adjustable, 24VAC/DC
77-SR3P-05	Socket, 11 pin
77-TB-201-99	Photo control base
77-TL201-71	Photocontrol 208-277 VAC
Class 1 Only	
77-937-100	Transformer, 240/30.3 VAC 60 Hz (ZA757)
77-937-106	Transformer, 240/30.3 VAC 60 Hz (ZA737)
Class 2 Only	
77-937-105	Transformer, 240/34 VAC, 60 Hz (ZA757)

**FLIGHT LIGHT/CEGELEC
ZA737/757 PAPI Style A and B
Parts List**

77-937-107	Transformer, 240/34 VAC, 60 Hz (ZA737)
15-757AD	ZA757 Aiming and Alignment Device
Components:	
77-210	Aiming Device frame
77-#98-6	Level, spirit, precision, 6"
77-5211BK	Case, 51" X 11"X 5"
15-737AD	ZA737 Aiming and Alignment Device
Components:	
77-ECS61BC	Monitor
77-RM2S-UL	Relay, 240 VAC