ADB Airfield Solutions

Service Bulletin

ALN138

Retain for future use.

Rev. i, 5/1/14

Upgrading a PAPI Style-A Control Board 44D1475/3 Using KIT 94A0549 or Upgrading a CCT Regulator Control Board 44D1475 Using 44A6546/KIT

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1.0 Kits

Upgrade a CCT from a 44D1475 to a 44A6546 Control Board using KIT 44A6546/KIT or upgrade a PAPI A from a 44D1475/3 to a 44A6546/3 Control Board using KIT 94A0549.

The CCT Control Boards 44A6546 is designed as direct drop-in replacements for the 44D1475 CCT Control Board. The PAPI 44A6546/3 is also a direct drop-in replacement for the 44D1475/3 PAPI “A” Control Board with the addition of an additional transformers and some component wiring changes.

A comparison of the old and new versions side-by-side (See Figure 1 and Figure 2) shows that there are obvious differences in the new board. This Service Bulletin will review the following items: Mounting, Connectors, PAPI T5 Wiring Installation, T2 Current Transformer, Setting the Step Jumper (3 or 5 step), Adjusting the Output Current.

1.1 Record of Changes

Page	Rev	Description	EC No.	Checked	Approved	Date
All	E	Updated Kits				30 Sep 09
	F	Added in the CCT info				26 Oct 11
All	G	Updated procedures and drawings		DM	JC	07 Aug 13
All	H	Updated Kit numbers and parts		DM	JG	12/12/13
	i	Changed title to ALN				5/1/14

1.2 Safety

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

1.2.1 To use this equipment safely:

WARNING

Read installation instructions in their entirety before starting installation.

- Refer to the FAA Advisory Circular AC 150/5340-26, Maintenance of Airport Visual Aids Facilities, for instructions on safety precautions.
- Observe all safety regulations. To avoid injuries, always disconnect power before making any wiring connections or touching any parts. Refer to FAA Advisory Circular AC 150/5340-26.
- Become familiar with the general safety instructions in this section of the manual before installing, operating, maintaining or repairing this equipment.
- Read and carefully follow the instructions throughout this manual for performing specific tasks and working with specific equipment.
- Make this manual available to personnel installing, operating, maintaining or repairing this equipment.
- Follow all applicable safety procedures required by your company, industry standards and government or other regulatory agencies.
- Install all electrical connections to local code.
- Use only electrical wire of sufficient gauge and insulation to handle the rated current demand. All wiring must meet local codes.
- Route electrical wiring along a protected path. Make sure they will not be damaged by moving equipment.
- Protect components from damage, wear, and harsh environment conditions.
- Allow ample room for maintenance, panel accessibility, and cover removal.
- Protect equipment with safety devices as specified by applicable safety regulations.
- If safety devices must be removed for installation, install them immediately after the work is completed and check them for proper functioning prior to returning power to the circuit.

1.2.1.1 Additional Reference Materials:

- NFPA 70B, Electrical Equipment Maintenance.
- NFPA 70E, Electrical Safety Requirements for Employee Workplaces.
- ANSI/NFPA 79, Electrical Standards for Metalworking Machine Tools.
- OSHA 29 CFR, Part 1910, Occupational Health and Safety Standards.
- National and local electrical codes and standards.

1.2.2 Qualified Personnel

The term **qualified personnel** is defined here as individuals who thoroughly understand the equipment and its safe operation, maintenance and repair. Qualified personnel are physically capable of performing the required tasks, familiar with all relevant safety rules and regulations and have been trained to safely install, operate, maintain and repair the equipment. It is the responsibility of the company operating this equipment to ensure that its personnel meet these requirements.

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

1.3 Kit PCB

Figure 1: Old PAPI 44D1475/3 or CCT Control Board 44D1475

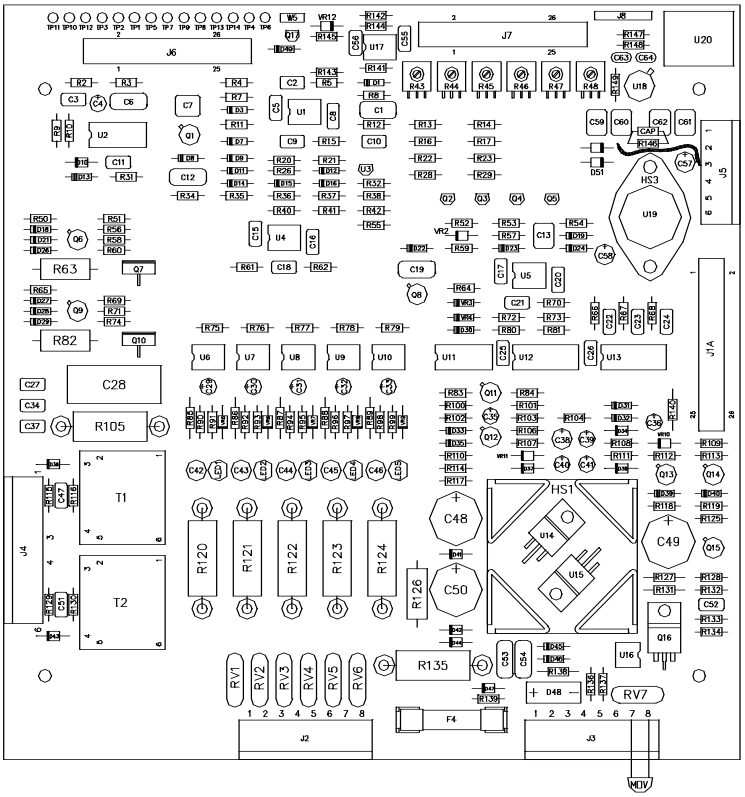
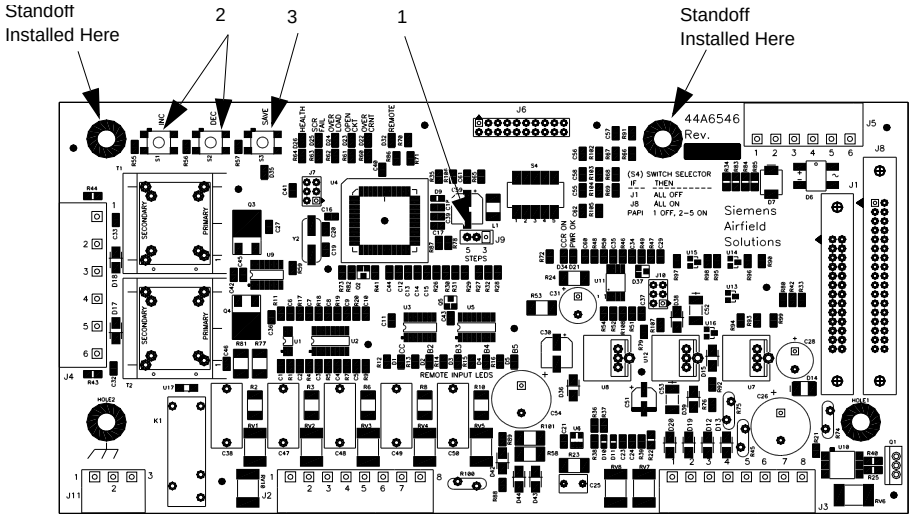


Figure 2: New PAPI 44A6546/3 or CCT Control Board 44A6546



1.3.1 Special Tools And Equipment Required (not supplied)

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

1.3.2 PAPI / CCT Kits

These kits contain the following components:

Table 1: Parts

Item No	ADB Part No	Description	PAPI		CCT	
			Units	Qty	Units	Qty
1	44A6546	PCB, CCT CONTROLLER	EA	0	EA	1
1	44A6546/3	PCB, PAPI-A CONTROLLER	EA	1	EA	0
2	65A0015/11	6-32 HEX NUT, SS	EA	2	EA	2
3	66A0026/11	#6 SPLIT LOCKWASHER, SS	EA	2	EA	2
4	66A0129/8	STANDOFF, M-F, 6-32 X 1/2" LG.	EA	4	EA	4
5	ALN138	SERVICE BULLETIN COPY	EA	1	EA	1
6	35A0548	TX CURRNT SENSE 6.6A-66mA	EA	1	EA	0
7	35A0685	TX 115/230 TO 14/28 VAC 50/60HZ	EA	1	EA	0
8	70A0576	DISCONNECT ADAPTER M-M-F	EA	2	EA	0
9	70A0671	3 CONDUCTOR COMPACT CONNECTOR	EA	4	EA	0
10	70A0175/4	TERM RING 22-18AWG #10 INSUL	EA	1	EA	0
11	89A0163/7	18AWG UL1015 16/30 GRN/Y	IN	6”	IN	0
12	89A0207/9	18AWG UL1007/1569 300V 105C 16X WHT	FT	13.5’	FT	0

1.3.3 Installation Instructions

WARNING

- Disconnect and lock out electrical power to the CCR.
- Remove all power to all the equipment before attempting to make any modifications.

Read and understand the service bulletin before working on the regulator or PAPI. Turn off and remove power to the regulator or PAPI. Open front compartment door.

1.3.4 CCT Kit 44A6546/KIT

1. Read and understand the service bulletin before working on the regulator. Turn off and remove power form the regulator. Open front compartment door.

1.3.5 Mounting

The 44A6546/KIT CCT Kit should contain:

- This Service Bulletin (ALN138)
- 44A6546 Assembly with two stacked, 1/2 inch standoffs in each of the two top mounting holes (See Figure 2)

2. If your original 44D1475 PCB was installed on 1 inch standoffs, you can install the new board as is. If your original PCB was installed on 1/2 inch standoffs, please remove one of the 1/2 inch standoffs from both standoff stacks of the new PCB. (See Figure 7 items 2-4)

   NOTE: Since the new board is half the size of the old board, two of the existing holes will be used, and two new PCB holes will have standoffs mounted in them to provide support for the PCB.

   NOTE: The two holes closest to J2, J3, & J4 (See Figure 2) will mount directly with the existing holes on the component panel so that J2, J3, and J4 will line up directly with their plugs. Make sure any ground wires that were connected via the old PCB mounting screws are re-connected as they were.

1.3.6 Connectors

3. As mentioned above, connectors J2, J3, & J4 line up directly with the new board and can be plugged in now.
4. J1 is a ribbon cable to the switch board that should easily move to the new J1 location. Note that next to J1 is a similar connector labeled J8. DO NOT PLUG the switch board into J8.
5. Depending on your regulator, cable-ties in the wire harness may need to be cut to move J5 to its new location.
6. Make sure that all ground wires and plugs are now connected to the new PCB.

1.3.7 Setting the Step Jumper

7. See Figure 2, Item 1. For a CCR, move jumper J9 to the 3 or 5-step position to match your CCR style.

1.3.8 Adjusting the CCR Output Current

8. Please refer to Table 2 for FAA CCR output current steps and ranges.

Table 2: FAA CCR Output Current Steps and Ranges

Class	Style	Step	Nominal Output	Allowable Range
1	1	B100	6.6	6.5-6.7
		B30	5.5	5.4-5.6
		B10	4.8	4.7-4.9
1	2	B5	6.6	6.5-6.7
		B4	5.2	5.1-5.3
		B3	4.1	4.0-4.2
		B2	3.4	3.3-3.5
		B1	2.8	2.7-2.9
2	2	B5	20.0	19.7-20.3
		B4	15.8	15.5-16.1
		B3	12.4	12.1-12.7
		B2	10.3	10.0-10.6
		B1	8.5	8.2-8.8

To adjust the output current, perform the following procedure:

1. Remove the field load and short the output of the CCR. Taking this precaution will protect your field circuit from damage if the output current is initially too high at startup.
2. Connect a clamp-on True RMS ammeter (such as a Fluke 87 multi-meter with current clamp or equivalent) around one of the output current leads.

   NOTE: Make sure the meter is set on the AC current scale.

   NOTE: Because the output current waveform is not a true sine wave, the ammeter must be of the True-RMS type. Field instruments such as clamp-on ammeters and Simpson voltmeters will give erroneously low readings.
3. For a CCR, verify that the Control PCB jumper J9 (Figure 4, Item 1) is set to the step setting that matches the CCR (3 or 5-step).
4. Turn on the CCR and set local control switch to the highest intensity step, B5 for 5-step CCR, B100 for a 3-step CCR.
5. The external True-RMS ammeter should read 6.60 ±0.1 amps (or 20.0 ±0.3 amps). If the reading is outside of this range, adjust the output current with buttons INC and DEC (Figure 4, Item 2) on the Control PCB until the correct current is obtained. Press and hold the SAVE button (Figure 2, Item 3) for two seconds to save the setting.
6. Turn off the CCR. Remove the short from the output and apply the field load.
7. Again, turn on the CCR or PAPI and set local control switch to the highest intensity step, B5 for 5-step CCR, B100 for a 3-step CCR, or 100% with a PAPI.
8. The external True-RMS ammeter should read 6.60 ±0.1 amps (or 20.0 ±0.3 amps). If the reading is outside of this range, adjust the output current with buttons INC and DEC (Figure 4, Item 2) on the Control PCB until the correct current is obtained. Press and hold the SAVE button (Figure 4, Item 3) for two seconds to save the setting.

   NOTE: Each CCR output current step is independently adjustable and must be independently saved.
9. Set the local switch to next to the lowest brightness step, and verify that the True-RMS ammeter reading corresponds to Table 2. If the reading is not in the current value range given in Table 2, adjust the appropriate step until the correct current value is obtained.
10. Repeat Step 2 for the remaining lower brightness step(s).
11. When the output current adjustment has been completed, turn off the CCR.

1.3.9 Adjusting the CCR Over Current Detection Level

Before adjusting the Over Current Detection level, set up the regulator and adjust the output current per “Adjusting the CCR Output Current” on page 4.

NOTE: The Over Current setting is pre-set and should normally not need adjusted.

To adjust the overcurrent, perform the following procedure:

1. Short the output of the CCR so the field load cannot be damaged by an over current situation during the adjustment.
2. Turn the local switch to the highest brightness step, B5 for 5-step CCR, B100 for a 3-step CCR. The true-RMS ammeter should read 6.6 or 20.0 amps.
3. Press and hold for three seconds both the INC and DEC buttons (Figure 4, Item 2). The LED next to the SAVE button (Figure 4, Item 3) will light when you are in the Over Current Adjustment Mode.

   NOTE: The CCR output current will increase to the level previously set as the Over Current level. This will be above 6.6 amps (or 20 amps).
4. Press the INC or DEC buttons (Figure 4, Item 2) until you reach the desired Over Current detection level.
5. Press and hold the SAVE button for two seconds. The SAVE LED will go out and the CCR output will go back to the top step setting (6.6 or 20A).
6. Remove the short from the CCR output and apply the field load.

1.4 PAPI A 94A0549 Kit

1.4.1 Mounting

The 94A0549 KIT will contain a 35A0548 current transformer.

If your original 44D1475/3 PCB was installed on 1 inch standoffs, you can install the new board as is. If your original PCB was installed on 1/2 inch standoffs, please remove one of the 1/2 inch standoffs from both standoff stacks of the new PCB.

Since the new board is half the size of the old board, two of the existing holes will be used, and two new PCB holes will have standoffs mounted in them to provide support for the PCB.

The two holes closest to J2, J3, & J4 (See Figure 5) will mount directly with the existing holes on the component panel so that J2, J3, and J4 will line up directly with their plugs. Make sure any ground wires that were connected via the old PCB mounting screws are re-connected as they were.

1.4.2 Connectors

As mentioned above, connectors J2, J3, & J4 line up directly with the new board and can be plugged in now.

J1 is a ribbon cable to the switch board that should easily move to the new J1 location. Note that next to J1 is a similar connector labeled J8. DO NOT PLUG the switch board into J8.

Depending on your regulator, cable-ties in the wire harness may need to be cut to move J5 to its new location.

Make sure that all ground wires and plugs are now connected to the new PCB.

1.4.3 PAPI T5 Wiring Instruction

See Figure 3, Figure 4, Figure 5, Figure 6, Figure 8 and Figure 9.

1.4.3.1 Primary side:

1. Disconnect wire# 126 from F1 and connect wire# 167 with the adapter from the kit to F1.
2. Connect wire#126 to the adapter with wire# 167.
3. Disconnect wire# 127 from F2 and connect wire# 168 with the adapter from the kit to F2.
4. Connect wire# 127 to adapter with wire# 168. The other end of the wires 167 and 168 need to be terminated to terminals 1 and 6 of transformer T5.

1.4.3.2 Secondary side:

1. Move wires 110 and 111 at terminals 5 and 9 of K3 to terminals 6 and 10 of K3 so that it matches the schematic.
2. Disconnect wire #100 and 105 from circuit board connector J3-1 and J3-3.
3. Connect wire #105 to splice connector connecting 105A from the kit. Wires 105A and 100A need to be terminated to terminals 7 and 12 of transformer T5.
4. Connect wire #100 to splice connector connecting 100A from the kit.
5. Disconnect wire #104 and 106 from circuit board connector J3-1 and J3-3.
6. Connect wire #104 to splice connector connecting 104A from the kit.
7. Connect wire #106 to splice connector connecting 106A from the kit.
8. Connect the wire #104A to K3-5.
9. Connect the wire #106A to K3-8.
10. Use wire #172 from the kit and connect circuit board connector J3-1 to K3-9.
11. Use wire #173 from the kit and connect circuit board connector J3-3 to K3-12.
12. Connect the ring terminal from wire# 900 to the base of the T5 mounting screw.

    NOTE: Install the jumper wires for the transformer terminals 2 and 5 and terminals 8 and 11 if the T5 transformer is shipped without the wires installed.

1.4.4 PAPI Current Transformer T2

PAPI kit 94A0549 contains a 35A0548 current transformer. Replace the T2 current transformer (35A0493) that is currently in the PAPI Master Cabinet with this new transformer (See Figure 5).

Figure 3: Old PAPI A Control Board 44D1475/3

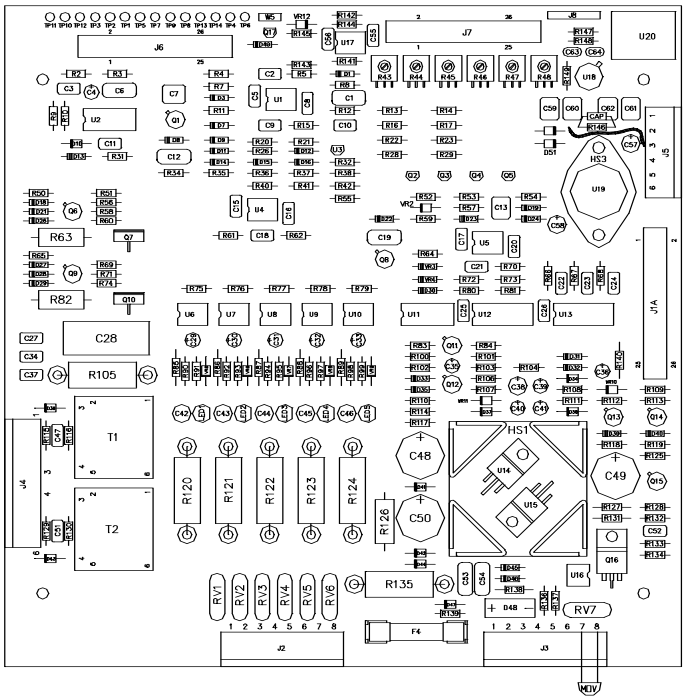


Figure 4: New PAPI A Control Board 44A6546/3

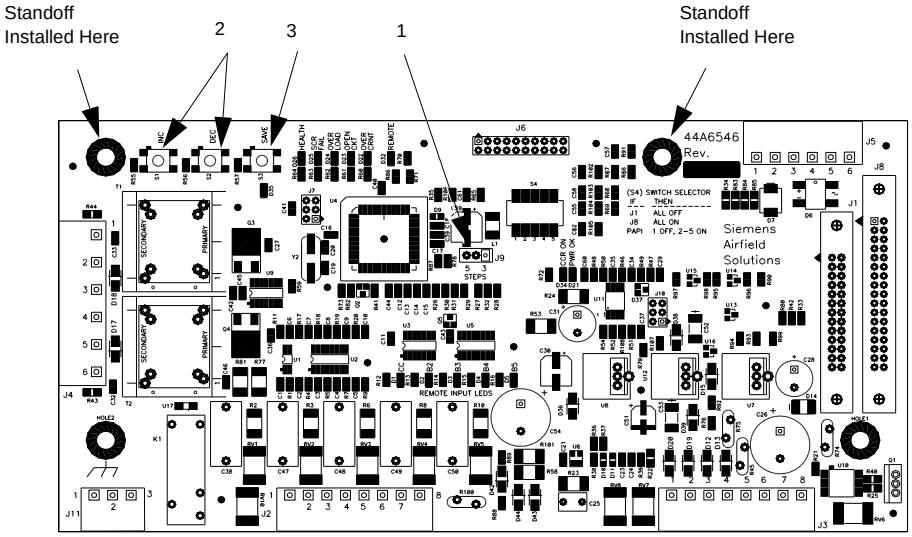
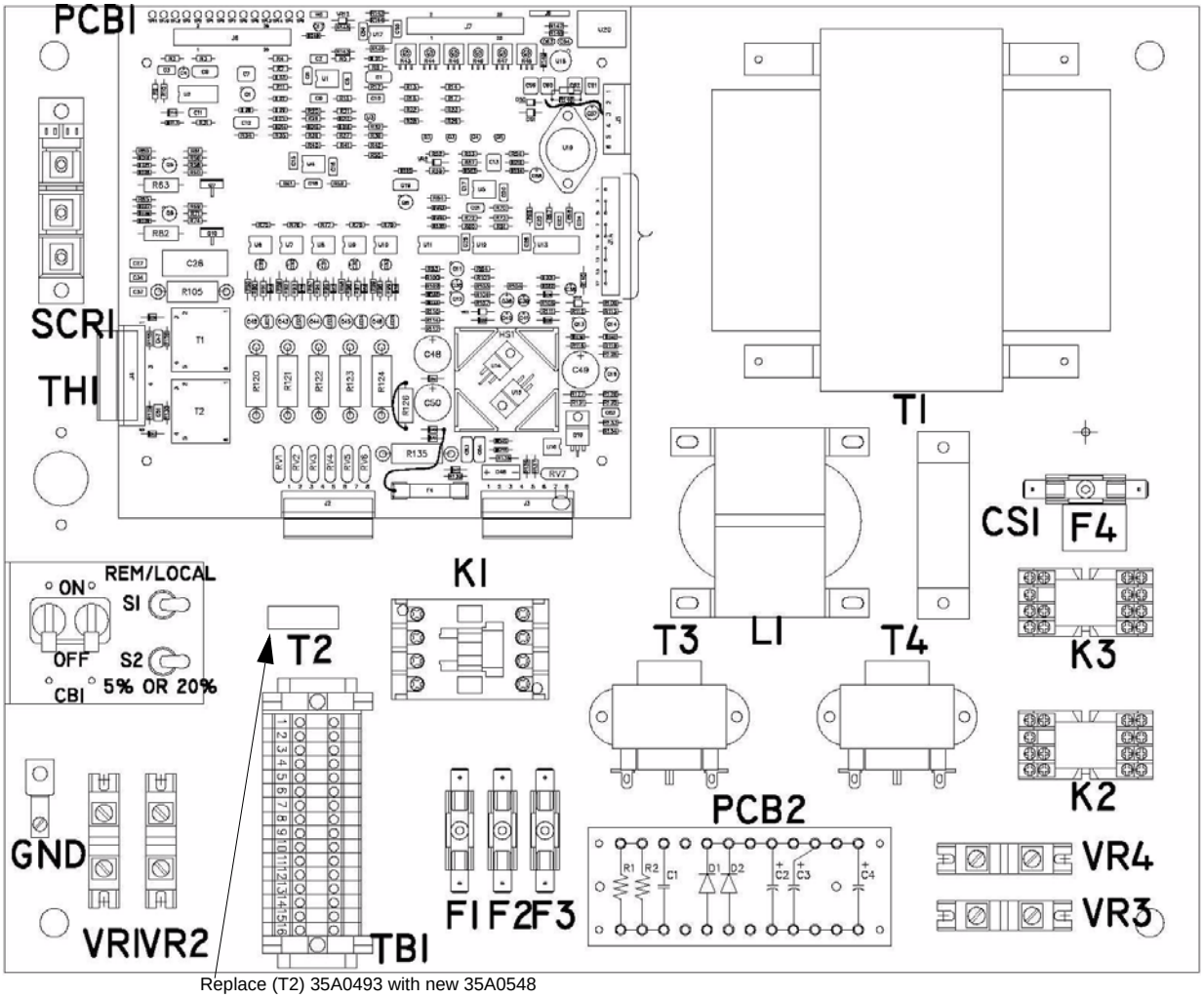
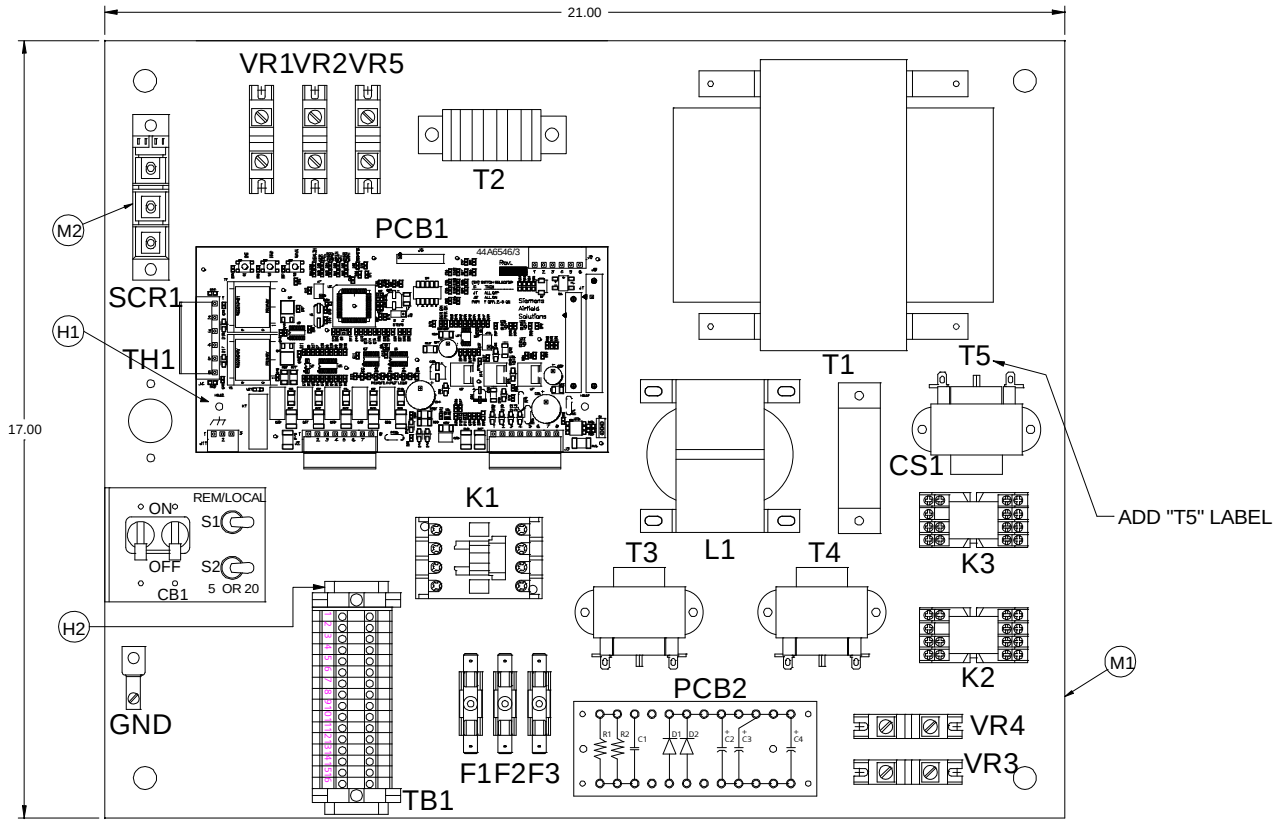


Figure 5: PAPI A OLD Panel Assembly



Replace (T2) 35A0493 with new 35A0548

Figure 6: PAPI A NEW Panel Assembly



1.4.5 Setting the Step Jumper

See Figure 4, Item 1.

For a PAPI, verify the jumper J9 is in the 3-step position.

1.4.6 Adjusting the PAPI Output Current

Please refer to Table 3 for FAA PAPI output current steps and ranges.

Table 3: FAA PAPI Output Current Steps and Ranges

Intensity	Equivalent Output Current
5%	4.09 A
20%	5.08 A
100%	6.6 A

To adjust the output current, perform the following procedure:

1. Remove the field load and short the output of the PAPI. Taking this precaution will protect your field circuit from damage if the output current is initially too high at startup.
2. Connect a clamp-on True RMS ammeter (such as a Fluke 87 multi-meter with current clamp or equivalent) around one of the output current leads.

   NOTE: Make sure the meter is set on the AC current scale.

   Because the output current waveform is not a true sine wave, the ammeter must be of the True-RMS type. Field instruments such as clamp-on ammeters and Simpson voltmeters will give erroneously low readings.
3. For a PAPI, verify that the Control PCB jumper J9 (Figure 4, Item 1) is set to the 3-step setting.

4. Turn on the PAPI and set local control switch to the highest intensity step, 100% with a PAPI.

   NOTE: An easy way to achieve the 100% setting on a PAPI is to remove the photo-eye from its socket. This will force the PAPI to daytime mode (100% light output).

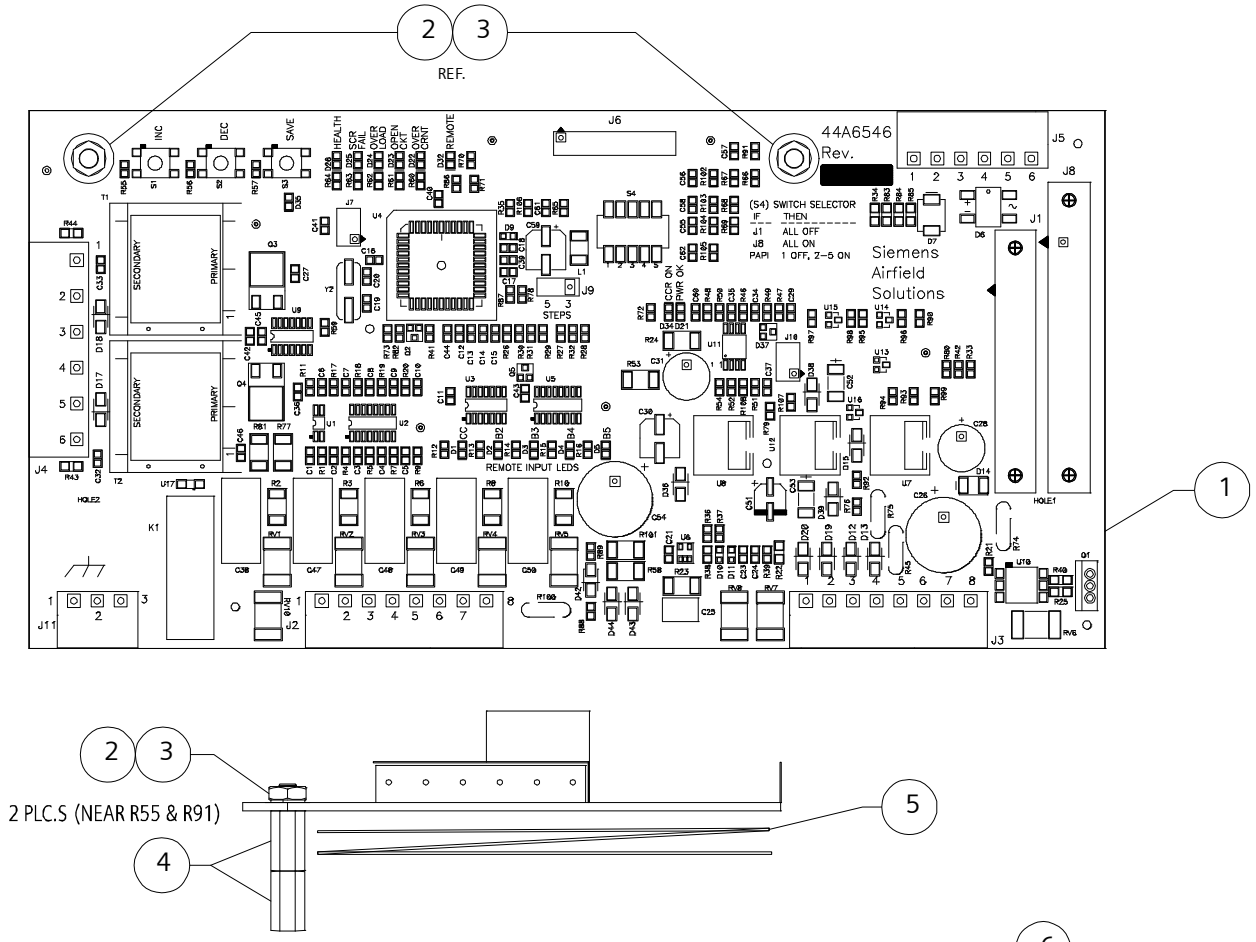
5. The external True-RMS ammeter should read 6.60 ±0.1 amps. If the reading is outside of this range, adjust the output current with buttons INC and DEC (Figure 2, Item 2) on the Control PCB until the correct current is obtained. Press and hold the SAVE button (Figure 4, Item 3) for two seconds to save the setting.
6. Turn off the PAPI. Remove the short from the output and apply the field load.
7. Again, turn on the PAPI and set local control switch to the highest intensity step, 100% with a PAPI.
8. The external True-RMS ammeter should read 6.60 ±0.1 amps. If the reading is outside of this range, adjust the output current with buttons INC and DEC (Figure 4, Item 2) on the Control PCB until the correct current is obtained. Press and hold the SAVE button (Figure 4, Item 3) for two seconds to save the setting.

   NOTE: Each PAPI output current step is independently adjustable and must be independently saved.

9. Set the local switch to next to the lowest brightness step, and verify that the True-RMS ammeter reading corresponds to Table 3. If the reading is not in the current value range given in the Tables, adjust the appropriate step until the correct current value is obtained.
10. Repeat Step 2 for the remaining lower brightness step(s).
11. When the output current adjustment has been completed, turn off the PAPI.

1.4.7 Diagrams

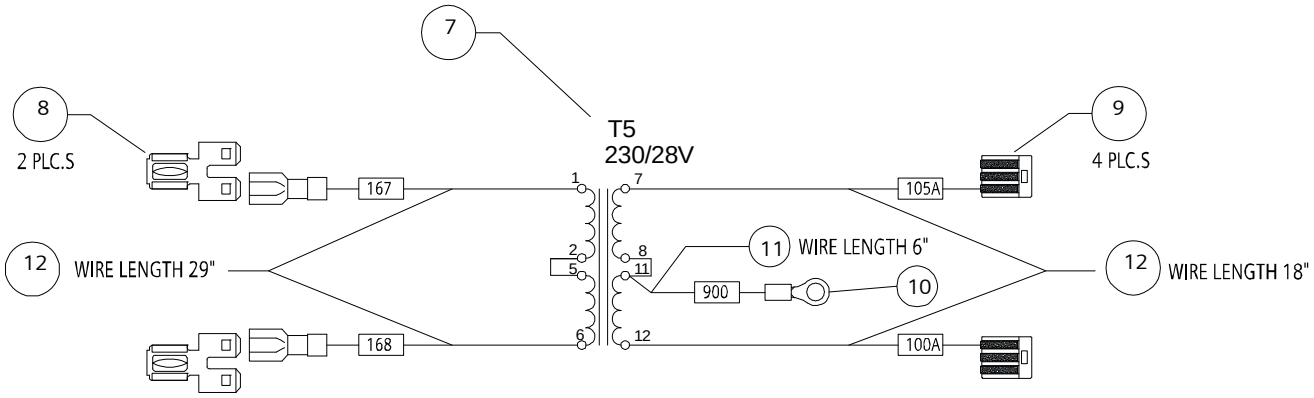
Figure 7: Kit 94A0549



ASSEMBLY NOTES:
1) ATTACH ITEMS 2, 3, AND 4 AS SHOWN TO ITEM 1.
2) FOR 94A0549: FOLD ALN138 AND PLACE WHERE SHOWN. RE-PACK PCB AND ALN138 INTO STATIC BAG FOR SHIPPING.
3) PLACE ITEM 6 IN A SEPERATE BAG.

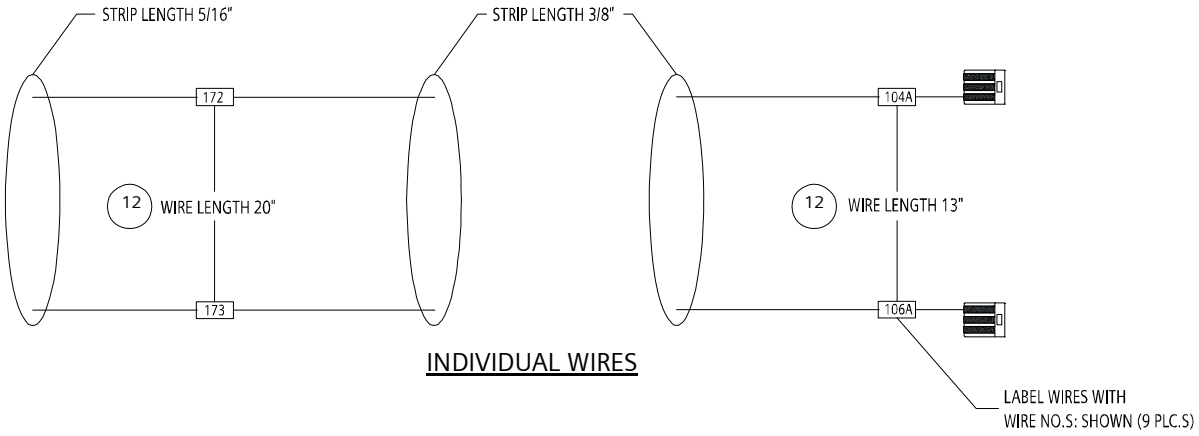
PAPI A 94A0549 Kit

Figure 8: T5 Wiring Diagram



T5 WIRING

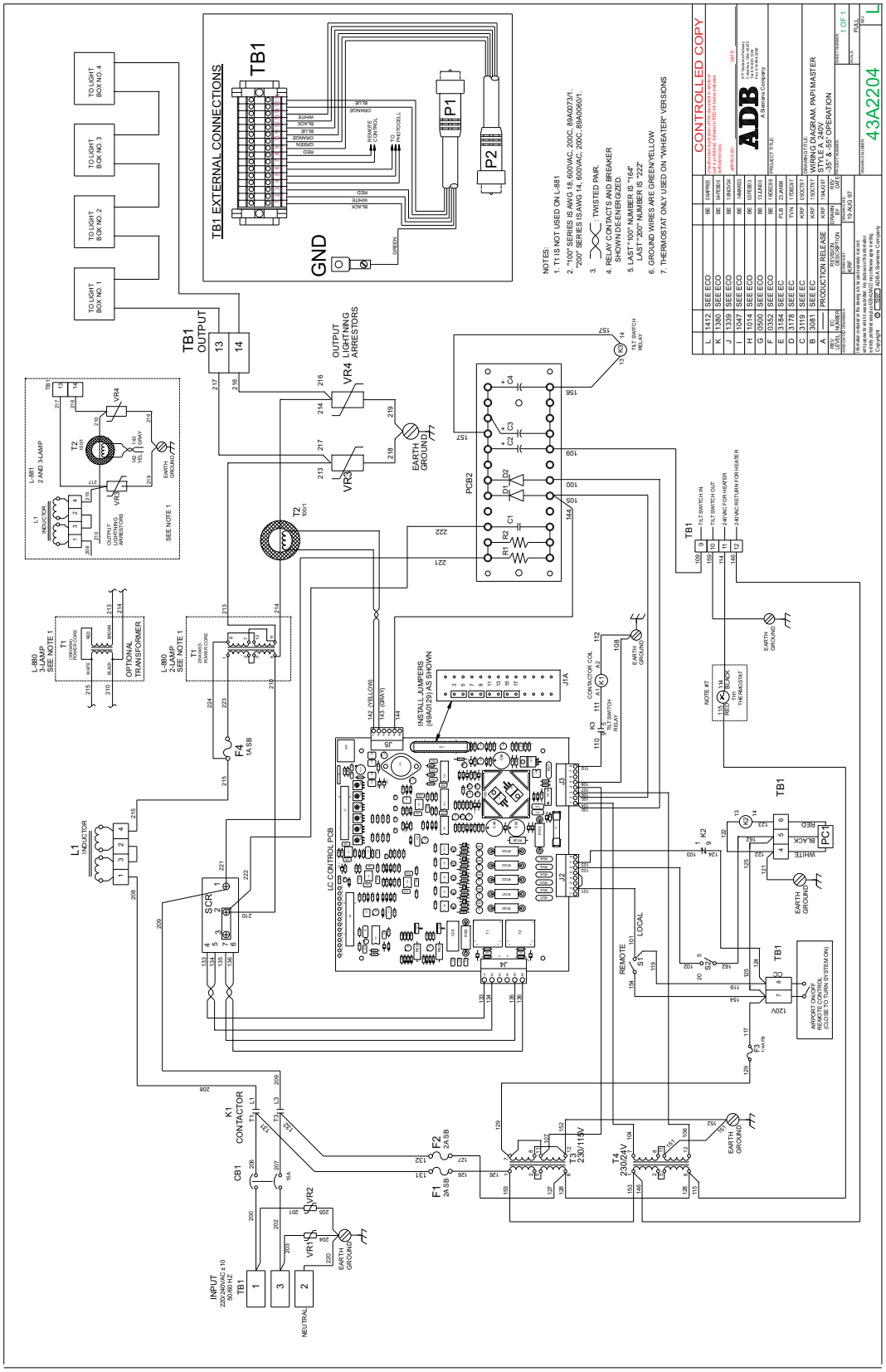
Figure 9: Wiring Diagram



INDIVIDUAL WIRES

1.5 Schematics

Original PAPI A Wiring 43A2204 Rev L



Schematics

Figure 10: PAPI A wiring 43A2204 Rev P

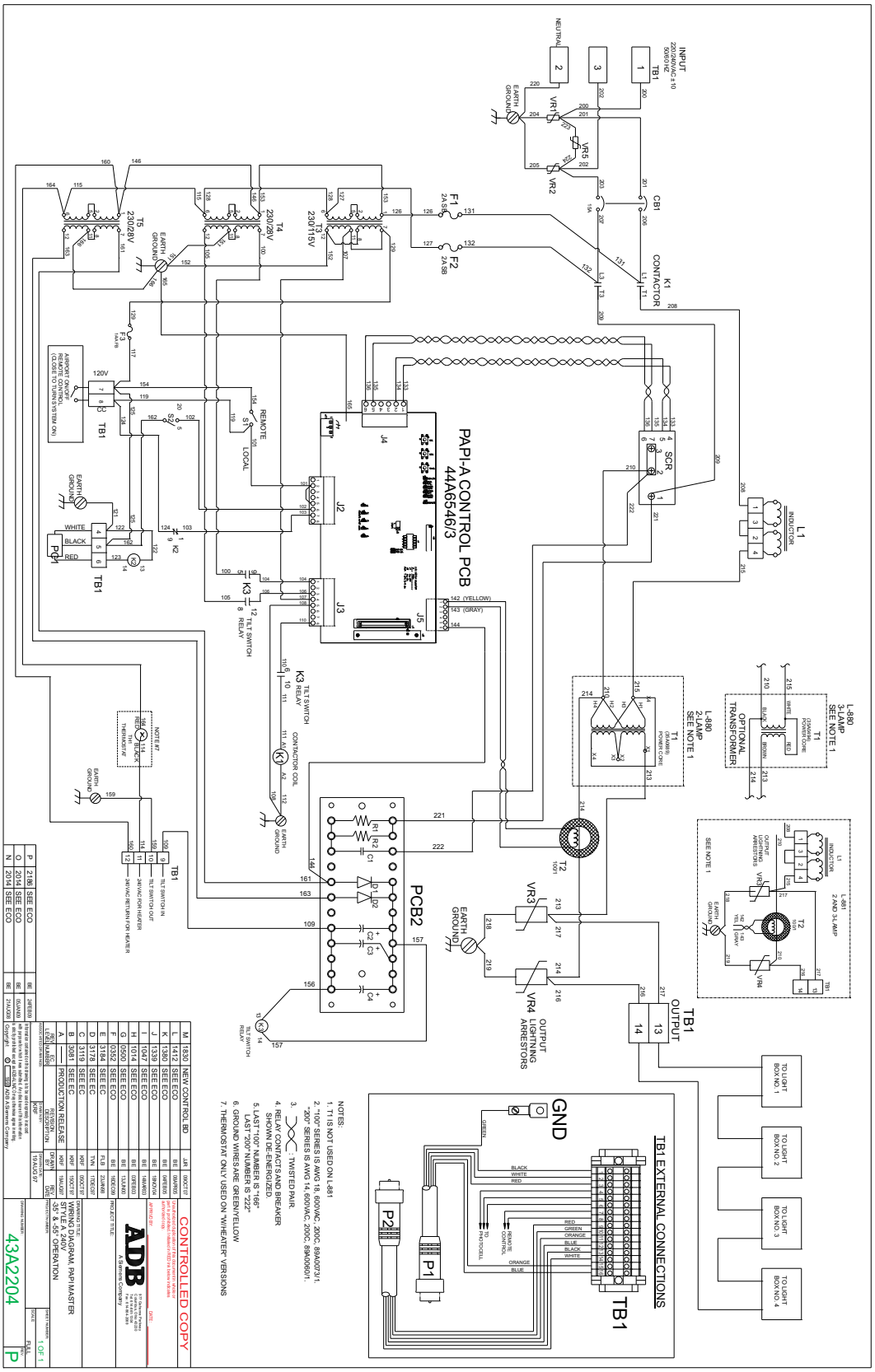


Figure 11: PAPI A Wiring 43A2204 Rev Q

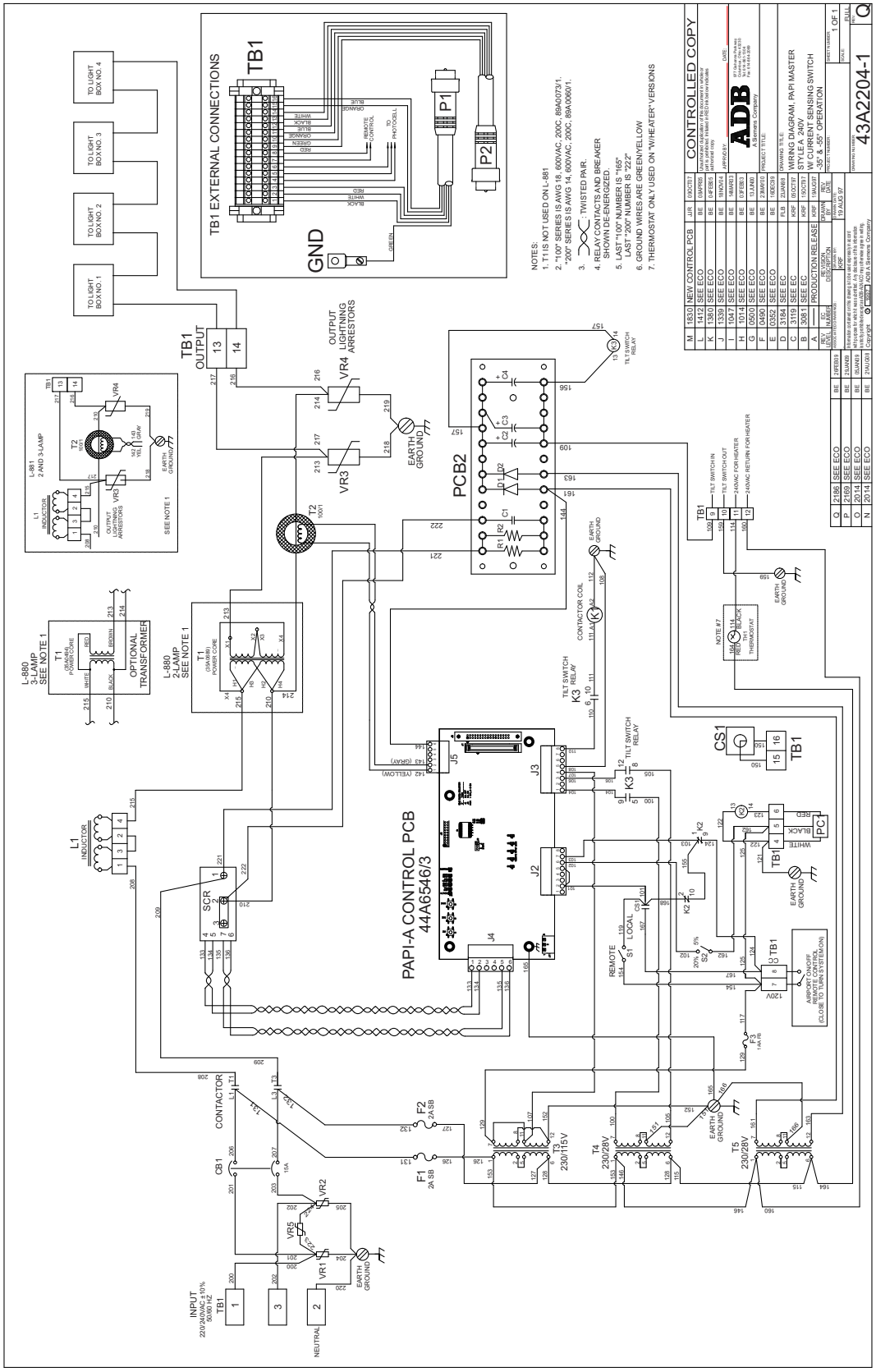
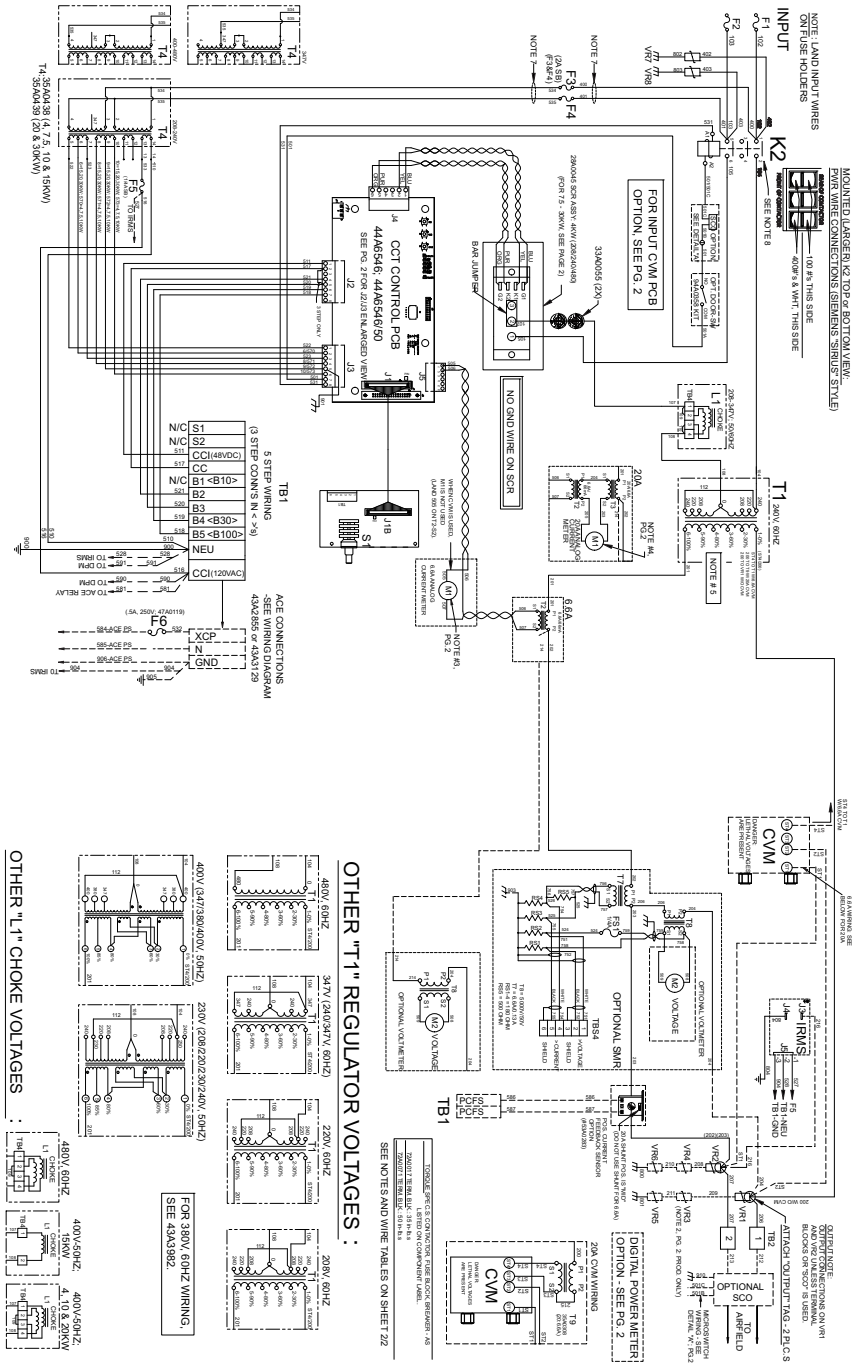


Figure 12: CCT Wiring Diagram



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