



Advanced Control Equipment ACE™

Document No. 96A0245

Issued: February 27, 2001

Rev.D: Aug 17, 2011

ADB Airfield Solutions, LLC
977 Gahanna Parkway
Columbus, OH 43230
USA

Tel: +1 (614) 861-1304
Fax: +1(614) 864-2069
www.adb-airfieldsolutions.com

Copyright © 2001 by ADB Airfield Solutions, LLC. All rights reserved.

Table of Contents

| | |
|--|-----|
| Record of Changes | ii |
| Table of Contents | iii |
| Warranties | iv |
| | |
| 1. Safety | 1 |
| Safety Symbols..... | 1 |
| Qualified Personnel..... | 2 |
| Intended Use | 2 |
| Installation..... | 3 |
| Operation..... | 3 |
| Maintenance and Repair..... | 4 |
| | |
| 2. Description | 6 |
| ACE™ Power Supply Circuit Board | 7 |
| ACE™ Input / Output Circuit Board | 7 |
| ACE™ Processor Circuit Board | 8 |
| ACE™ Lamps Out Circuit Board | 8 |
| ACE™ Front Panel Display Circuit Board | 8 |
| | |
| 3. Theory of Operation..... | 10 |
| ACE™ Communication | 10 |
| ACE™ Input / Output | 11 |
| ACE™ Failsafe Functionality | 11 |
| | |
| 4. Installation Instructions..... | 12 |
| ACE™ Mounting Location..... | 12 |
| ACE™ Mounting Orientation..... | 12 |
| ACE™ Mounting Instructions | 13 |
| ACE™ Cable Entry and Wiring..... | 16 |
| ACE™ Wiring | 17 |
| | |
| 5. ACE™ Troubleshooting | 19 |
| | |
| 6. Parts..... | 21 |
| Introduction | 21 |
| Using the Illustrated Parts List..... | 21 |
| ACE™ Part Numbering System..... | 22 |
| Spare Parts..... | 24 |

Warranties

Products of Siemens Airfield Solutions manufacture are guaranteed against mechanical, electrical, and physical defects (excluding lamps) for a period of one year from the date of installation or a maximum of two years from the date of shipment and are guaranteed to be merchantable and fit for the ordinary purposes for which such products are made.

Siemens Airfield Solutions will correct by repair or replacement, at its option, equipment or parts which fail because of mechanical, electrical or physical defects, provided that the goods have been properly handled and stored prior to installation, properly installed and properly operated after installation, and provided further that Buyer gives Siemens Airfield Solutions written notice of such defects after delivery of the goods to Buyer.

Siemens Airfield Solutions reserves the right to examine goods upon which a claim is made. Said goods must be presented in the same condition as when the defect therein was discovered. Siemens Airfield Solutions further reserves the right to require the return of such goods to establish any claim.

Siemens Airfield Solutions's obligation under this guarantee is limited to making repair or replacement within a reasonable time after receipt of such written notice and does not include any other costs such as the cost of removal of defective part, installation of repaired product, labor or consequential damages of any kind, the exclusive remedy being to require such new parts to be furnished.

Siemens Airfield Solutions's liability under no circumstances will exceed the contract price of goods claimed to be defective. Any returns under this guarantee are to be on a transportation charges prepaid basis. For products not manufactured by, but sold by Siemens Airfield Solutions, warranty is limited to that extended by the original manufacturer.

This is Siemens Airfield Solutions's sole guarantee and warranty with respect to the goods; there are no express warranties or warranties of fitness for any particular purpose or any implied warranties of fitness for any particular purpose or any implied warranties other than those made expressly herein. All such warranties being expressly disclaimed.

Disclaimers

This manual could contain technical inaccuracies or typographical errors. Siemens Airfield Solutions reserves the right to revise this manual from time to time in the contents thereof without obligation of Siemens Airfield Solutions to notify any person of such revision or change.

Details and values given in this manual are average values and have been compiled with care. They are not binding, however, and Siemens Airfield Solutions disclaims any liability for damages or detriments suffered as a result of reliance on the information given herein or the use of products, processes or equipment to which this manual refers. No warranty is made that the use of the information or of the products, processes or equipment to which this manual refers will not infringe any third party's patents or rights. The information given does not release the buyer from making their own experiments and tests.

Advanced Control Equipment ACE™

1. Safety

This section contains general safety instructions for using your Siemens Airfield Solutions equipment. Task- and equipment-specific warnings are included in other sections of this manual where appropriate. Note all warnings and follow all instructions carefully. Failure to do so may result in personal injury, death, or property damage.

To use this equipment safely,

- 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 remove power prior to making any wire connections and touching any parts. Refer to FAA Advisory Circular AC 150/5340-26.
- read and become familiar with the general safety instructions provided in this section of the manual before installing, operating, maintaining, or repairing this equipment.
- read and carefully follow the instructions given throughout this manual for performing specific tasks and working with specific equipment.
- store this manual within easy reach of 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.
- obtain and read Material Safety Data Sheets (MSDS) for all materials used.

Safety Symbols

Become familiar with the safety symbols presented in this section. These symbols will alert you to safety hazards and conditions that may result in personal injury, death, or property and equipment damage.



WARNING: Failure to observe this warning may result in personal injury, death, or equipment damage.



WARNING: Risk of electrical shock. Failure to observe this warning may result in personal injury, death, or equipment damage.

Safety Symbols (contd.)

WARNING: Disconnect equipment from line voltage. Failure to observe this warning may result in personal injury, death, or equipment damage.



WARNING: Wear safety goggles. Failure to observe may result in serious injury.



CAUTION: Failure to observe may result in equipment damage.

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 see that its personnel meet these requirements.

Intended Use

WARNING: Use of this equipment in ways other than described in this manual may result in personal injury, death, or property and equipment damage. Use this equipment only as described in this manual.

Siemens Airfield Solutions cannot be responsible for injuries or damages resulting from nonstandard, unintended applications of its equipment. This equipment is designed and intended only for the purpose described in this manual. Uses not described in this manual are considered unintended uses and may result in serious personal injury, death, or property damage.

Unintended uses may result from taking the following actions:

- making changes to equipment that have not been recommended or described in this manual or using parts that are not genuine Siemens Airfield Solutions replacement parts
- failing to make sure that auxiliary equipment complies with approval agency requirements, local codes, and all applicable safety standards
- using materials or auxiliary equipment that are inappropriate or incompatible with your Siemens Airfield Solutions equipment
- allowing unqualified personnel to perform any task

Installation

Read the installation section of all system component manuals before installing your equipment. A thorough understanding of system components and their requirements will help you install the system safely and efficiently.



WARNING: Failure to follow these safety procedures can result in personal injury or death.

- Allow only qualified personnel to install Siemens Airfield Solutions and auxiliary equipment. Use only approved equipment. Using unapproved equipment in an approved system may void agency approvals.
- Make sure all equipment is rated and approved for the environment in which you are using it.
- Follow all instructions for installing components and accessories.
- 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.

Operation

Only qualified personnel, physically capable of operating the equipment and with no impairments in their judgment or reaction times, should operate this equipment.

Read all system component manuals before operating this equipment. A thorough understanding of system components and their operation will help you operate the system safely and efficiently.

Operation *(contd.)*

- Before starting this equipment, check all safety interlocks, fire-detection systems, and protective devices such as panels and covers. Make sure all devices are fully functional. Do not operate the system if these devices are not working properly. Do not deactivate or bypass automatic safety interlocks or locked-out electrical disconnects or pneumatic valves.
- Never operate equipment with a known malfunction.
- Do not attempt to operate or service electrical equipment if standing water is present.
- Use this equipment only in the environments for which it is rated. Do not operate this equipment in humid, flammable, or explosive environments unless it has been rated for safe operation in these environments.
- Never touch exposed electrical connections on equipment while the power is ON.

Maintenance and Repair

Allow only qualified personnel to perform maintenance, troubleshooting, and repair tasks. Only persons who are properly trained and familiar with Siemens Airfield Solutions equipment are permitted to service this equipment.

- Always use safety devices when working on this equipment.
- Follow the recommended maintenance procedures in your equipment manuals.
- Do not service or adjust any equipment unless another person trained in first aid and CPR is present.
- Connect all disconnected equipment ground cables and wires after servicing equipment. Ground all conductive equipment.
- Use only approved Siemens Airfield Solutions replacement parts. Using unapproved parts or making unapproved modifications to equipment may void agency approvals and create safety hazards.

Maintenance and Repair*(contd.)*

- Check interlock systems periodically to ensure their effectiveness.
- Do not attempt to service electrical equipment if standing water is present. Do not service electrical equipment in a high-humidity environment.
- Use tools with insulated handles when working with electrical equipment.
- When replacing or servicing the ACE™, turn the main circuit off until the operation is complete and personnel are no longer handling equipment.

2. Description

The ACE™ is at the heart of Siemens Airfield Solutions’s distributed computer control system. Siemens Airfield Solutions’s Advanced Control Equipment ACE™ (Figure 1) is the remote interface between the ALCS and any controlled element in the airfield lighting vault.

The ACE™ is a universal device that can be used to control any type of CCR and/or controlled element regardless of the manufacturer. Each CCR and Controllable item will be connected to an ACE™. The ACE™ is a microprocessor based module that includes all of the communication, control commands, input/output interface, and failsafe functionality (Figure 2) for the controlled element.

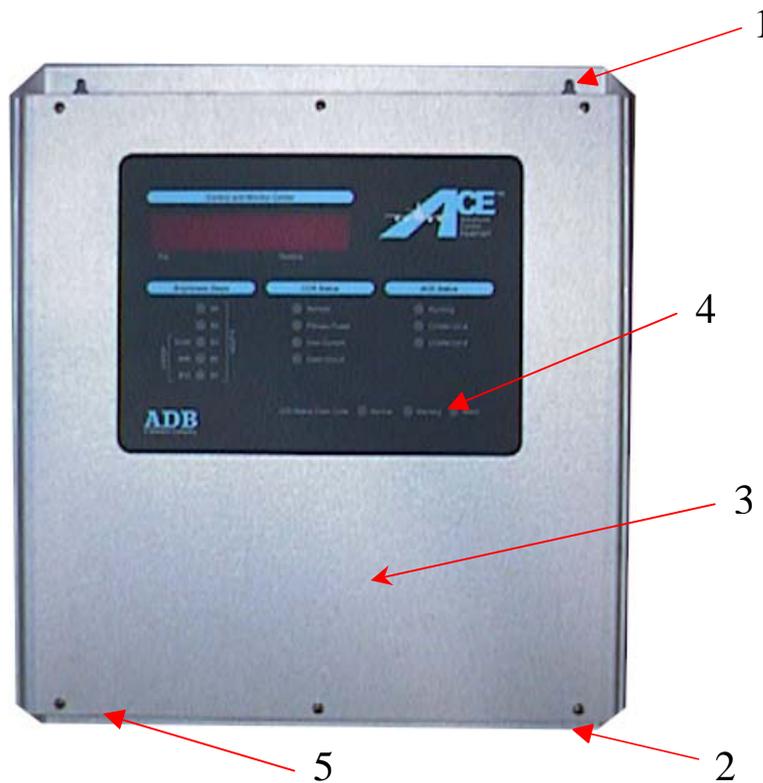
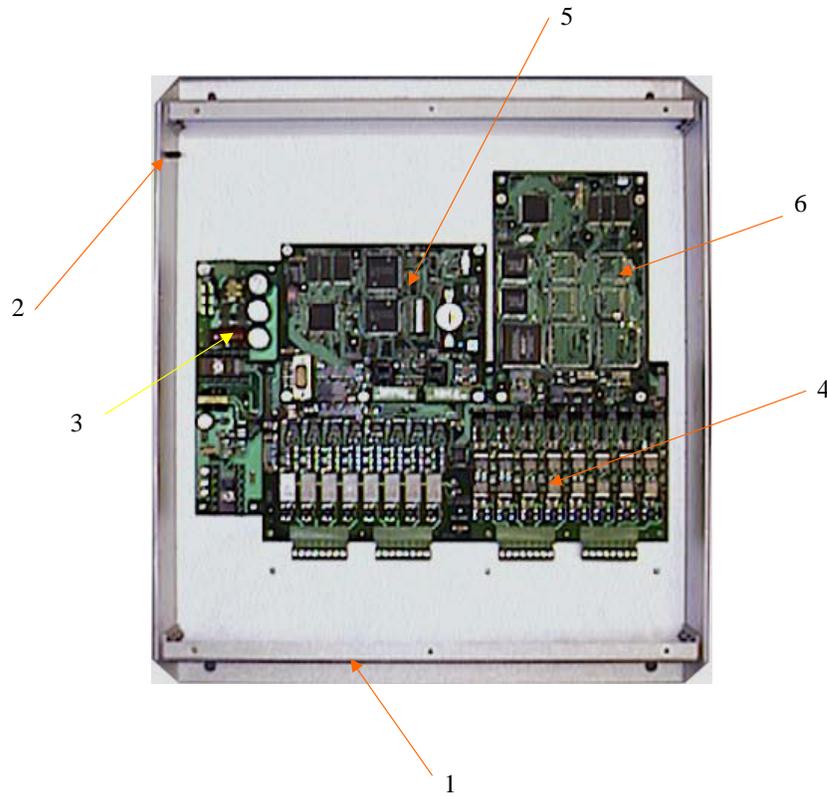


FIGURE 1. Advanced Control Equipment ACE™

| | | |
|---------------------------------|------------------------------|---------------------|
| 1. Top Mounting Holes | 2. Bottom Mounting Holes | 3. ACE™ Front Cover |
| 4. ACE™ Control/Monitor Display | 5. Bottom Cable Access Plate | |

2. Description (contd.)



| | | |
|--|------------------------------------|---------------------------------------|
| 1. Bottom Access Plate (Conduit Entry) | 2. Ground Lug | 3. Power Supply Printed Circuit Board |
| 4. Input/Output Printed Circuit Board | 5. Processor Printed Circuit Board | 6. Lamps Out Printed Circuit Board |

FIGURE 2. Advanced Control Equipment ACE™ Internals

Each ACE™ will have identical and interchangeable internal components. The following is a summary of the internal components of the ACE™.

ACE™ Power Supply Circuit Board

The ACE™ Power Supply Printed Circuit Board (Shown in figure 2) provides each of the printed circuit boards with a regulated and isolated power source.

ACE™ Input / Output Circuit Board

The ACE™ Input / Output Printed circuit board (Shown in figure 2) provides the interface for all control and monitoring connections. This board incorporates a distribution bus for interfacing internal boards. In addition, the quick-disconnect terminal blocks provide an easy to service point of connection. The Input / Output Printed circuit board contains eight (8) discrete latching relay outputs and eight (8) discrete input lines.

2. Description *(contd.)*

ACE™ Processor Circuit Board

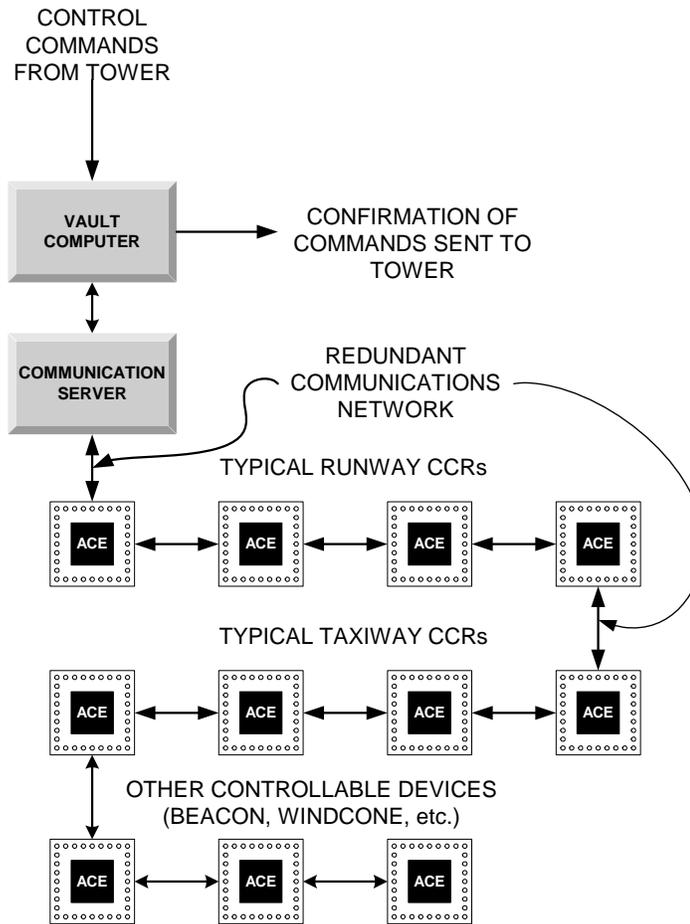
The ACE™ Processor Printed Circuit Board (Shown in figure 2) is the brain behind the design. It provides an interface for the redundant communication network, RCN, which is how ACE™ receives and transmits data to the ALCS vault computer. For easy access when connecting the redundant communication network to the ACE™, the board includes both RJ-45 plugs and quick-disconnects. In addition, the processor board contains a fiber optic interface for the optional Insulation Resistance Monitoring System.

ACE™ Lamps Out Circuit Board

The ACE™ Lamps Out Printed Circuit Board (Optional, Shown in figure 2) consists of a processor which interfaces, over a fiber optic serial communications link, with up to three Current and Voltage sensor modules. Siemens Airfield Solutions's Current and Voltage Sensor Module, which is mounted inside the CCR and is required with the Lamps Out monitoring option, measures current and voltage waveforms. In addition to RMS voltage, RMS current, apparent power (VA), true power, and power factor, the Lamps Out Printed Circuit Board, in turn, calculates the number of lamps burnt out (Up to 16) at each brightness level. The Lamps Out Board can be expanded, from single circuit monitoring capability, to monitoring of up to nine (9) circuits (Additional Circuit Boards).

ACE™ Front Panel Display Circuit Board

The ACE™ Control/Monitor Display (Shown in figure 1) provides a local control and monitoring interface for each controllable element. The display consists of several LEDs that give status indication of the ACE™, CCR brightness step, CCR remote/local status, CCR primary power, circuit current or voltage readings, and RCN channel status.

2. Description(*contd.*)

- A. Lighting commands are generated in the tower cab by air traffic controllers.
- B. Lighting commands are communicated, over the main airfield lighting communications network, to the electrical vault computer.
- C. The electrical vault computer, in turn, passes the lighting commands to the communication server.
- D. The communications server broadcasts the lighting commands over the ACE™ Redundant Communications Network.
- E. Finally, the ACE™ unit with the corresponding address that the lighting command is directed to executes the command.
- F. The command is internally confirmed by the ACE™ and a confirmation is sent back to the tower computer.

FIGURE 3. Signal Flow Diagram of Typical Airfield Lighting Electrical Vault

3. Theory of Operation:

The ACE™ represents the heart of Siemens Airfield Solutions's airfield lighting distributed control system. Distributed control technology has many advantages over traditional central control, including; Cost effectiveness; System expandability; Ease of maintenance; Ease of installation; Interchangeable parts; Ease of troubleshooting. In a distributed control scenario, each ACE™ unit is locally installed at or near a controllable item (CCR, Generator, ATS, etc.). Each ACE™ would, in turn, talk with the airfield lighting control network and execute remote lighting commands (Figure 3). The number of ACE™ units that can be daisy-chained together is virtually unlimited, thus system expansion is made easy.

The ACE™ is a universal device that can be used to control any type of CCR and/or controlled element regardless of the manufacturer. The ACE™ printed circuit boards are mounted inside a small and rugged environmental enclosure that can be wall mounted or directly attached to the door of a CCR. The ACE™ consists of a microprocessor-based module(s) that includes all of the communication, control commands, input/output interface, and failsafe functionality for the controlled element.

ACE™ Communication:

Each of the ACE™ units connected to a CCR or other controllable device will have a unique factory set address and a field programmable communication address. These addresses are used by the ALCS to direct lighting commands to the corresponding ACE™. The ACE™ in turn executes the commands and returns the operational status of the element back to the ALCS.

Each ACE™ is connected to redundant communication networks via dual resident RS-422 serial communication ports located on the processor printed circuit board. The ACE™ network is comprised of a communications server and all the daisy-chained ACE™ units in the lighting vault. The communications server stays in constant communication with all the ACE™ units in both of the networks while at the same time staying in constant contact with the main ALCS network. This communications protocol dictates that the local ACE™ store all data and parameters specific to the controlled element. This characteristic frees up the ALCS computers from having to store the parameters for each of the controlled elements. The result of this is real-time communication between all of the ACE™ units and the rest of the ALCS even if one of the ACE™ network connections fails.

3. Theory of Operation: (contd.)

ACE™ Input/output interface:

The ACE™ design is modular in nature. The input/output board incorporates a distribution bus for interfacing additional internal printed circuit boards. Adding additional boards give the ACE™ the potential of full FAA L - 827 CCR monitoring. In addition, the quick-disconnect terminal blocks provide an easy-to-service point of connection. The input / output printed circuit board contains eight (8) discrete latching relay outputs and eight (8) discrete input/output lines.

The latching output relays can be configured to control brightness steps of CCRs or simple ON/OFF control as required by the controlled element. The input lines can be configured to monitor any external event that is determined by a discrete contact closure. Some examples include generator monitoring, monitoring of Automatic Transfer Switch position, and control of Circuit Selector Switch loops. In addition, the ACE™ can be expanded to perform CCR output voltage and current monitoring (OPTIONAL) as well as field circuit cable Insulation Resistance Monitoring (OPTIONAL).

ACE™ Failsafe Functionality:

Each ACE™ unit will provide a self-contained failsafe feature. This feature will insure default airfield lighting operation in the event of an ALCS component failure or even a complete ALCS failure. In addition, each ACE™ monitors its outputs and verifies proper commands are executed. The failsafe system also permits maintenance of portions of the control system without changing the operational status of the lighting system.

The failsafe mode of each ACE™ unit is defined per the requirements of the airport/owner. The failsafe modes are as follows:

ACTIVE FAILSAFE MODE: This mode is executed as follows:

- If the CCR was switched ON before the failure, it will remain ON at the same brightness level.
- If the CCR was switched OFF before the failure, it will switch ON to a pre-determined brightness level.

PASSIVE FAILSAFE MODE: This mode is executed as follows:

- If the CCR was switched ON before the failure, it will remain ON at the same brightness level.
- If the CCR was switched OFF before the failure, it will remain OFF.

4. Installation Instructions

ACE™ Mounting Location:

Locate each ACE™ unit as close as possible to each of the controllable elements (i.e. Regulator, Generator etc.). Exact locations should be coordinated with the Airport / Engineer.

ACE™ Mounting Orientation:

Each ACE™ must be mounted flush against a wall or on U-rails that will support all four (4) corners. The unit must be oriented as seen in Figure 4.



Figure 4: Advanced Control Equipment

4. Installation Instructions *(contd.)*

ACE™ Mounting Instructions:

Important Note: The ACE™ enclosure is designed such that the unit can be replaced easily without having to remove any of the mounting hardware. Follow these instructions closely.

A. Position the enclosure flush on its mounting surface and mark the mounting holes in all four (4) corners. Make sure to mark the top portion of the slotted mounting hole as seen in Figure 4. Mounting hardware must fit through lower opening of the top slotted mounting holes as seen in Figure 4.

B. Drill out the marked holes and insert anchor hardware as required.

C. Carefully remove the lid of the enclosure and disconnect the grounding strap from the main enclosure.

D. Remove the six (6) screws that attach the BOTTOM access plate to the enclosure as seen in Figure 5. There are three (3) screws on each side.

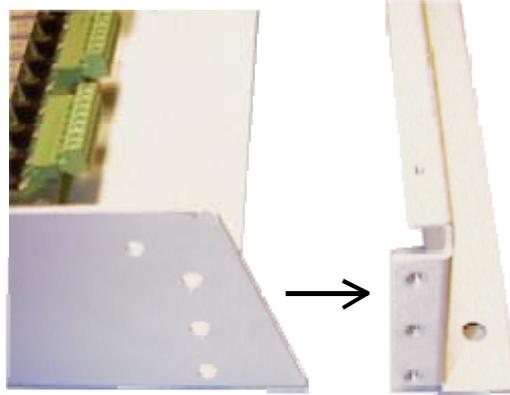


Figure 5: Bottom access plate screw removal

4. Installation Instructions *(contd.)*

- E. Remove the **BOTTOM** access plate from the main enclosure as seen in Figure 6, and put aside temporarily.

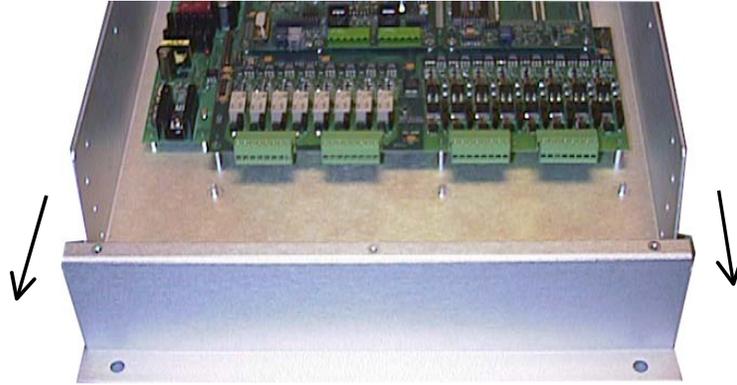


Figure 6: Removal of bottom access plate

- F. Mount the **MAIN** enclosure using the top, slotted mounting holes and secure as seen in Figure 7.

Place large opening over screw and pull down securing the top mounting holes.

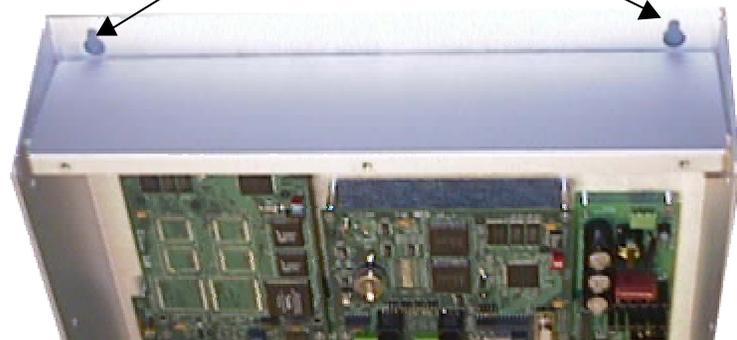
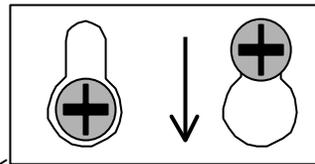


Figure 7: Securing the main enclosure

- G. Re-attach the **BOTTOM** access plate to the main enclosure using the six (6) screws.

4. Installation Instructions *(contd.)*

H. Mount the BOTTOM access plate using the bottom, round mounting holes as seen in Figure 8.

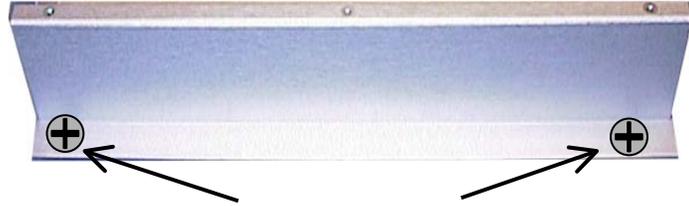


Figure 8: Securing the bottom access plate

4. Installation Instructions *(contd.)*

ACE™ Cable Entry and Wiring:

Important Note: All conduit and wiring must only enter the ACE™ enclosure through the bottom access plate. This will facilitate quick maintenance and replacement of the ACE™ unit.

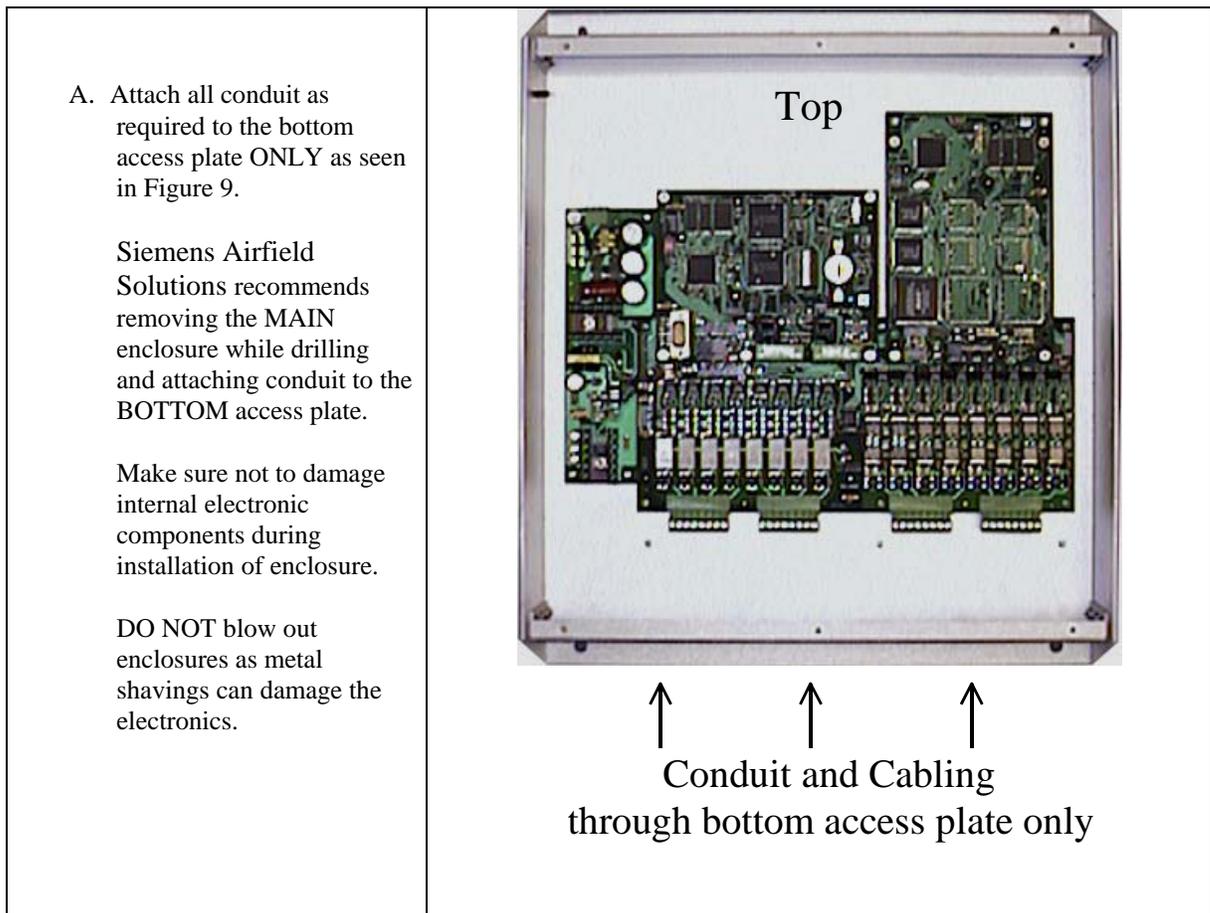
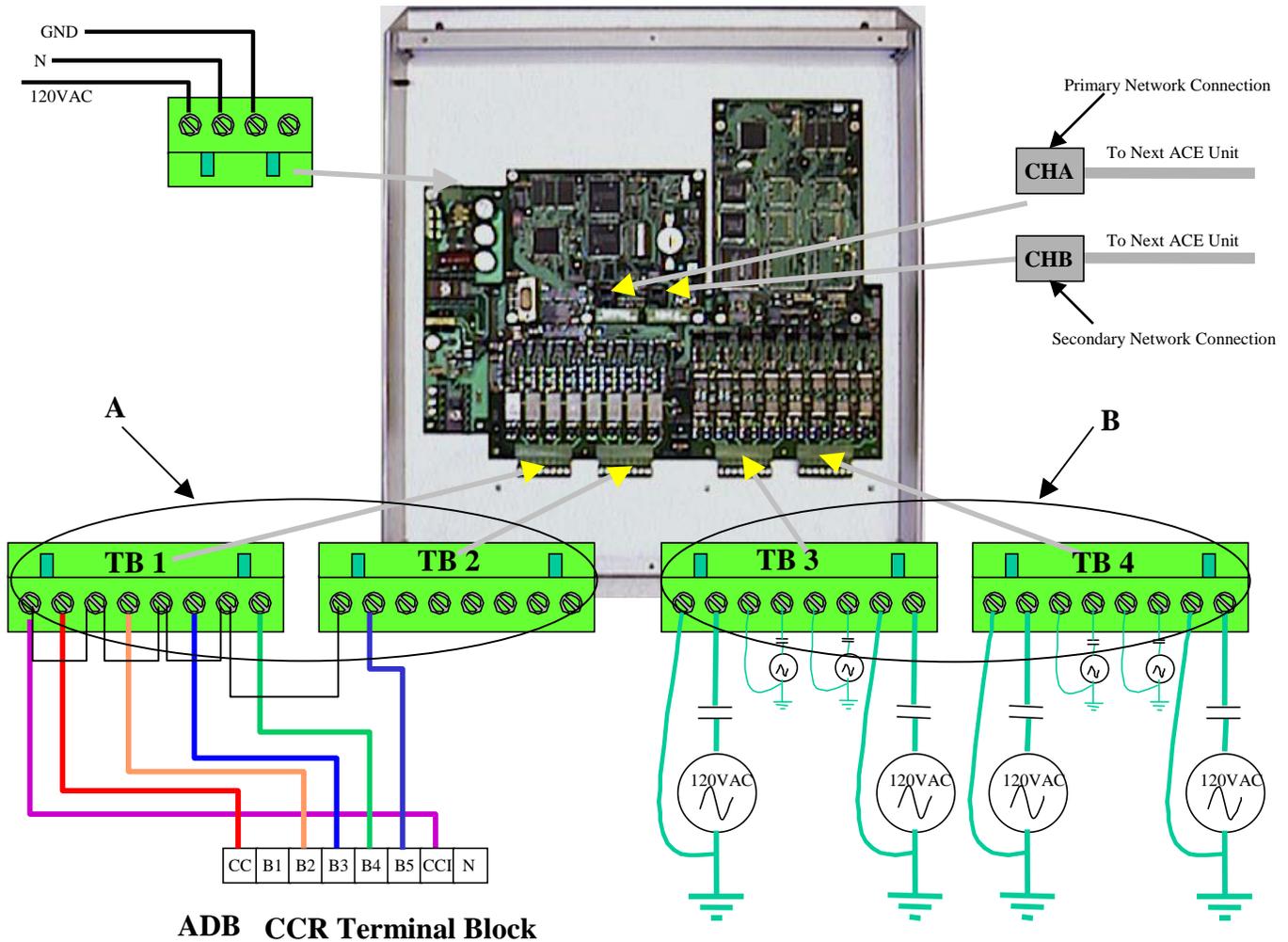


Figure 9: Conduit and Cable entry locations

4. Installation Instructions (contd.)

ACE™ Wiring:

Pull control, monitor and power wiring as required and terminate as indicated on the “System External Wiring Diagrams” which are included with ALCS system prints.



- A. Terminal blocks TB1 and TB2 are system latching relay outputs that are used to control brightness steps of a CCR. These output can also be configured to control any element that requires an ON/OFF contact closure. In addition, these terminal blocks can be configured to control both CCR brightness steps and a L – 847 – X Circuit Selector Switch.
- B. Terminal blocks TB3 and TB4 accept any discrete contact closure that uses a 120VAC control voltage. Examples of useful inputs are: CCR Over Current, CCR Over Voltage, CCR Primary Power, CCR Remote Local, CCR Open Circuit, CCR Access Door, etc.

Figure 10. Generic Terminal Block wiring example with terminal block definitions

4. Installation Instructions *(contd.)*

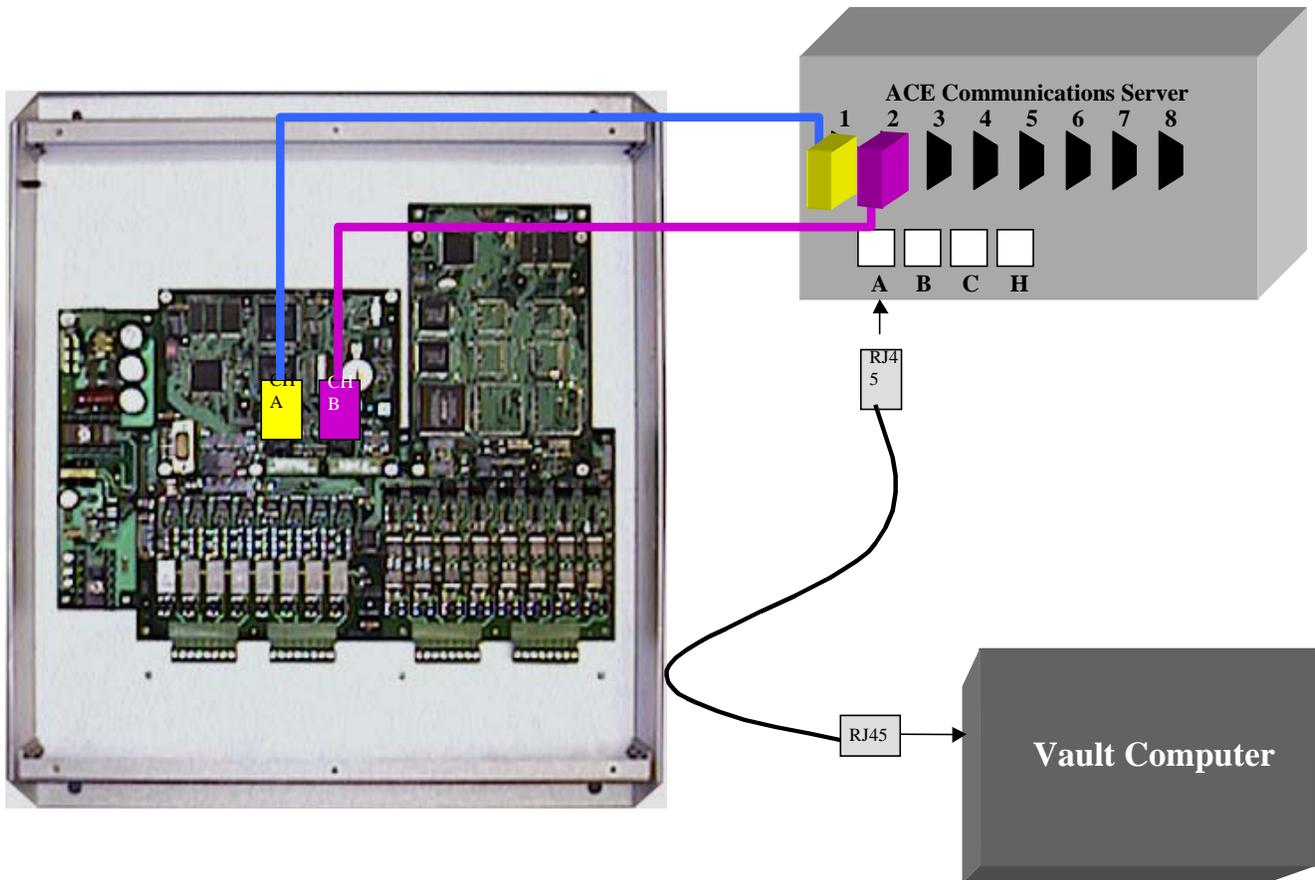


Figure 11. ACE™ communications network generic wiring diagram. For specific wiring diagrams of these connections please consult “System External Wiring Diagrams” which are included with ALCS system prints.

5. ACE™ Troubleshooting

In the unlikely event that an ACE™ unit is determined to be malfunctioning, the following guide will help to diagnose the problem and provide a solution to quickly get the unit functioning properly. Before beginning, remember improper or incorrect wiring is the cause of most problems. So, first check all wiring for loose connections or possible electrical shorts/opens.

| Problem | Possible Solution |
|---|---|
| ACE™ Front Panel Status LED not illuminated | <p>Make sure the main power LEDs on the input/output printed circuit board are illuminated. If these LEDs are not illuminated then power to the ACE™ is not being supplied. Make sure the ACE™ Power supply printed circuit board (Figure 10) is receiving 120VAC at the main power quick disconnect terminal block. Make sure that all wire connections are secure.</p> <p>If the main power LEDs on the input/output printed circuit board are illuminated, make sure the ribbon cable that connects the front panel display to the ACE™ processor board is secure.</p> <p>The ACE™ design allows for additional printed circuit boards to be added to the basic system. Due to the nature of how the additional boards are connected to the existing boards it is necessary to make sure that the additional printed circuit boards are seated in their connector.</p> |
| ALCS reporting failed communication with a specific ACE™ | Check for power indication. If all of the boards have power, refer to the Processor board LED description table (Table 1) for normal operation of each of the LEDs: If any of the LEDs are not functioning as described in the table, cycle ACE™ power and recheck. If problem still occurs contact your Siemens Airfield Solutions service representative. |
| Channel A LED not Flashing | Cycle power to the ACE™ unit. If the problem still persists turn off the power to the ACE™ and inspect all wires and wire terminations for loose or degrading wire. Check the continuity of the wire connecting the defective ACE™ and the next device in the ACE™ network. If the problem still persists contact your Siemens Airfield Solutions service representative. |
| Channel B LED not Flashing | Cycle power to the ACE™ unit. If the problem still persists turn off the power to the ACE™ and inspect all wires and wire terminations for loose or degrading wire. Check the continuity of the wire connecting the defective ACE™ and the next device in the ACE™ network. If the problem still persists contact your Siemens Airfield Solutions service representative. |
| Either of the Internal Processor Board Diagnostic LEDs is frozen on or off. | If either of the LEDs is frozen, cycle the power to the ACE™. If the problem still persists contact your Siemens Airfield Solutions service representative |
| Lamps out board LED not flashing | Make sure the power LED, on the lamps out board, is on. If it is not, turn the power to the ACE™ off. Check the integrity of the header connection on the lamps out board. Turn the power to the ACE™ on. If the problem still persists contact you Siemens Airfield Solutions service representative. |

5. ACE™ Troubleshooting *(contd.)*

All of the ACE™ printed circuit boards have power indication LEDs. There is a bank of three LEDs located on the input / output board. These LEDs indicate the status of the raw DC voltage, regulated DC voltage, and board Reset status. All three of these LEDs should be on when there is power to the ACE™.

The second bank of LEDs indicate communication status and internal processor board diagnostic status. The following table summarizes the function of these LEDs. This bank of LEDs also form binary error codes. These codes are used by Siemens Airfield Solutions to determine board level problems.

| Circuit Board Label | LED description | Normal working operation |
|----------------------------|--|--|
| D10 | Processor board Power | Always on |
| D6 | Internal Processor Board Diagnostics | Flashing |
| D7 | Internal Processor Board Diagnostics | Flashing |
| D8 | Only used for error codes | Off |
| D9 | Only used for error codes | Off |
| D2 | Local Debug Communications Port Status | Flashing If Laptop is connected |
| D3 | Lamps Out Board communications Port Status | Flashing If lamps out board is connected |
| D4 | Channel B Communications Port Status | Flashing |
| D5 | Channel B Communications Port Status | Flashing |

Table 1: Processor board LED description

6. Parts

Introduction

To order parts, call Siemens Airfield Solutions Customer Service or your local Siemens Airfield Solutions representative. Use this five-column parts list, and the accompanying illustration, to describe and locate parts correctly.

Using the Illustrated Parts List

This subsection describes how to use the illustrated parts list covered later in this section. It does not provide the actual parts list.

The Item column numbers correspond to the numbers that identify parts in illustrations following each parts list. NS (not shown) indicates that a listed part is not illustrated.

The Description column gives the part name, as well as its dimensions and other characteristics when appropriate. Indentions show the relationships between assemblies, subassemblies, and parts.

The Part Number column gives the Siemens Airfield Solutions part number.

| Item | Description | Part Number | Quantity | Note |
|--------|----------------------------|-------------|----------|------|
| S1 | Assembly | XXXXXXXX | 1 | A |
| NS | Part | XXXXXXXX | 1 | |
| H1 | Part or Assembly | | | |
| | Part/Assembly for option 1 | XXXXXXXX | 2 | |
| | Part/Assembly for option 2 | XXXXXXXX | 2 | |
| T1 | Assembly | XXXXXXXX | 1 | |
| | • Part | XXXXXXXX | 1 | |
| | • Part | XXXXXXXX | 2 | |
| NOTE A | | | | |

The Quantity column contains the quantity required per unit, assembly, or subassembly. The code AR (As Required) is used if the part number is a bulk item ordered in quantities or if the quantity per assembly depends on the product version or model.

The Note column contains letters that refer to notes at the end of each parts list. Notes contain special ordering or product/part version information.

ACE™ Part Numbering System

Figure 12 shows how to determine the part number for an ACE with hinged enclosure. Figure 13 shows how to determine the part number for an ACE without hinged enclosure.

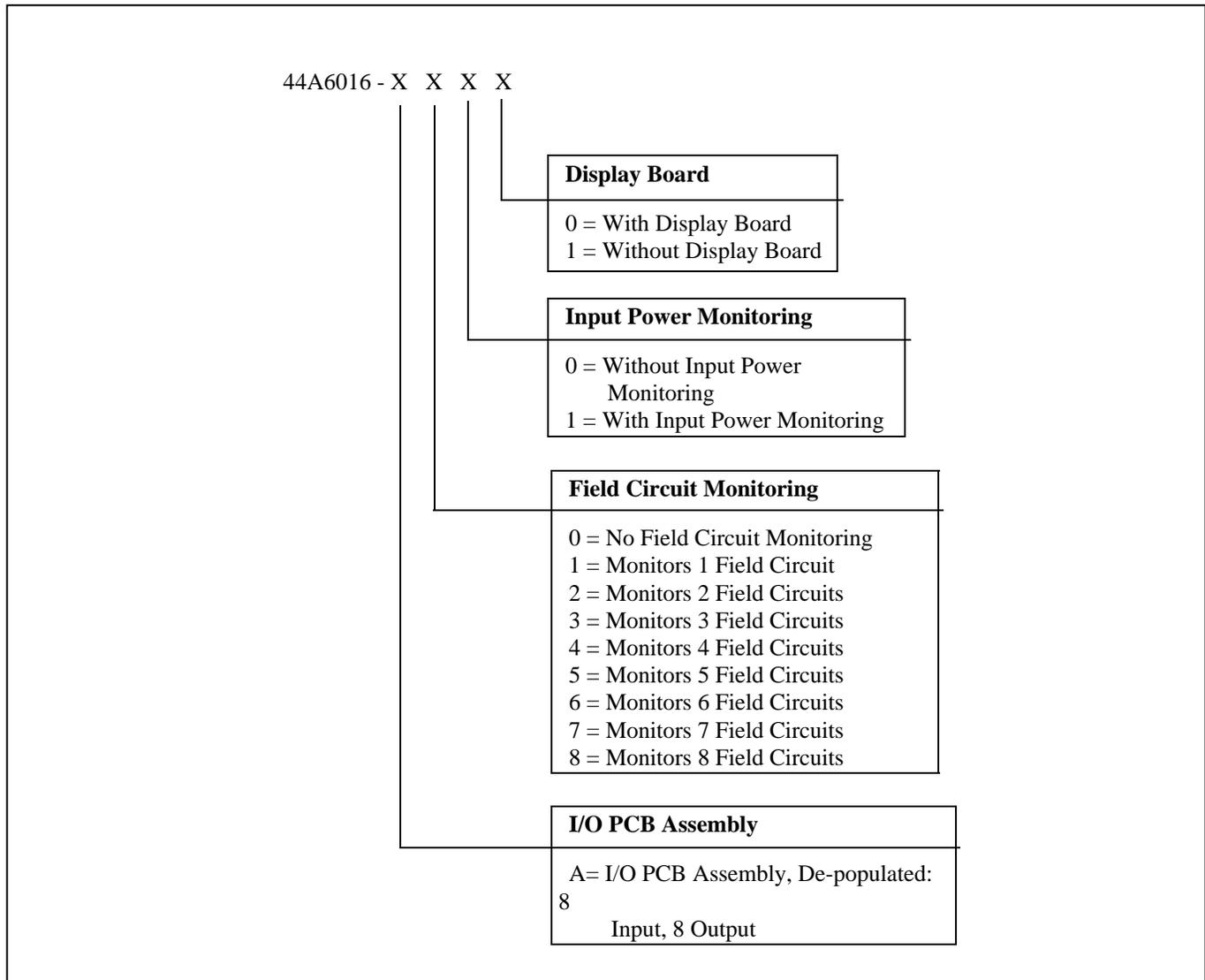


Figure 12: ACE™ with Hinged Enclosure Part Numbers

ACE™ Part Numbering System

(contd.)

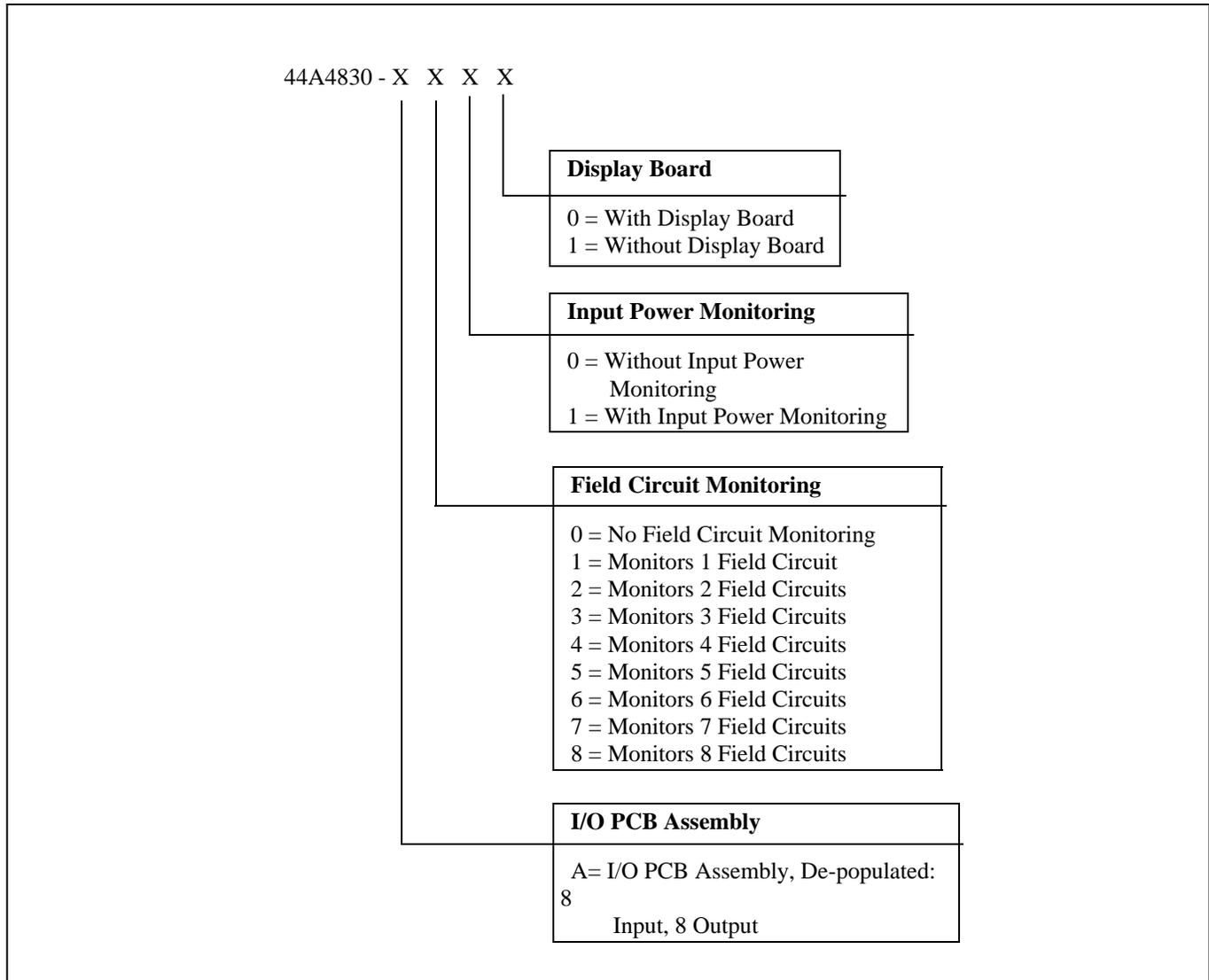


Figure 13: ACE™ without Hinged Enclosure Part Numbers

Spare Parts

The following tables describe part number assignments for the ACE™ unit. Since the ACE™ is modular in design, Table 2 shows what Siemens Airfield Solutions part numbers to use in the event a whole ACE™ is to be ordered. The second table shows individual component part numbers of the ACE™ unit.

| Siemens Airfield Solutions Part Number | Part Description |
|---|---|
| 44A4830/1000 | Basic ACE™ wall mount unit. This part number alone does not include the lamps out monitoring printed circuit board. |
| 44A4830/1000 94A0259/XX | Basic ACE™ wall mount unit including XX (X ranges from 01 to 09) number of field circuits to monitor current and voltage. This part number will also include the Current and Voltage Field Sensor Unit. |
| 44A4830/1000 94A0260/XX | Basic ACE™ wall mount unit including XX (X ranges from 01 to 09) number of field circuits to monitor Insulation Resistance. These part numbers will also include the Field Sensor Unit. |
| 44A4830/1000 94A0259/XX 94A0260/XX | Basic ACE™ wall mount unit including XX (X ranges from 01 to 09) number of field circuits to monitor current and voltage, and number of field circuits to monitor Insulation Resistance |

Table 2 Complete ACE™ assembly part numbers

| Siemens Airfield Solutions Part Number | Part Description |
|---|---|
| 44A4801 | ACE™ Processor Printed Circuit Board |
| 44A4800 | ACE™ Input / Output Printed Circuit Board |
| 44A4850 | ACE™ Power Supply Printed Circuit Board |
| 44A44A4802/1 | ACE™ Lamps Out Printed Circuit Board Populated for 1 field circuit |
| 44A44A4802/2 | ACE™ Lamps Out Printed Circuit Board Populated for 2 field circuits |
| 44A44A4802/3 | ACE™ Lamps Out Printed Circuit Board Populated for 3 field circuits |
| 44A4803 | ACE™ Front Display Printed Circuit Board |
| 44A5904 | ACE™ Front Display Lexan Overlay with Overlay Switches |
| 70A0525/03 | ACE™ Power Printed Circuit Board Power Connector Plug, 3 Position |
| 70A0525/06 | ACE™ Processor Printed Circuit Board Primary and Redundant Communications port Connector Plug, 6 Position |
| 70A0525/08 | ACE™ Input / Output Printed Circuit Board Connector Plug, 8 Position |
| 56A0386 | ACE™ Enclosure Assembly |

Table 3 ACE™ assembly part numbers