

UM6C55A

Candeo *SP* 48300 Power System

AP6C55AA

User Manual



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1. About this document

1.1. Purpose of this manual

This document provides the necessary information and procedures to operate and maintain an AP6C55AA Candeo *SP* 48300 power system.

Refer to installation manual IM6C55A for the detailed procedures to install an AP6C55AA Candeo *SP* 48300 power system.

1.2. Applicability of this manual

This document applies to an AP6C55AA Candeo *SP* 48300 power system having any configuration of controller, rectifier, distribution and battery equipment.

1.3. Notice of disclaimer

Emerson Energy Systems reserves the right, in its sole discretion, to revise the information contained in this document at any time without notice.

Emerson Energy Systems expressly advises that any use of or reliance upon information or opinion in this manual is at the risk of the user and that Emerson Energy Systems shall not be liable for any damage or injury incurred by any person arising out of the use of said information or opinion.

Note also that local conditions may give rise to a need for additional professional investigations, modifications, or safeguards to meet site, equipment, environmental safety, or operating company specific requirements. In no event is the information or opinion contained in this manual intended to replace federal, state/provincial, local, or other applicable codes, laws, or regulations. Specific applications will contain variables unknown to or beyond the control of Emerson Energy Systems. As a result, Emerson Energy Systems cannot warrant that the application of the information or opinion in this manual will produce the technical result or safety originally intended.


1.4. How this manual is organized


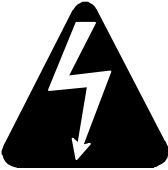

This document is divided into eight parts:

- 1) Front matters: contain the document information, the Table of Contents and the present Chapter.
- 2) Introduction: contains a brief description of the AP6C55AA Candeco *SP* 48300 power system.
- 3) Specifications: contains a brief description as well as the detailed mechanical, electrical and environmental characteristics of the individual components used in building the AP6C55AA Candeco *SP* 48300 power system.
- 4) Functional description: contains a detailed description of the operational features for each of the individual component of the AP6C55AA Candeco *SP* 48300 power system.
- 5) Configuring and operating the system: contains information on starting-up, configuring and operating the AP6C55AA Candeco *SP* 48300 power system.
- 6) Communicating with the System Manager *SP*: contains information on how to communicate with the system from a remote location.
- 7) Maintenance: contains the maintenance, troubleshooting and repair procedures required to maintain the AP6C55AA Candeco *SP* 48300 power system in a good operational state.
- 8) Appendices: provide information on spare parts, technical support, as well as a list of terms describing the acronyms and abbreviations used throughout the document.

1.5. Cautions and Warnings

The following Cautions and Warnings must be observed at all times when handling and operating this power equipment.

	<p>CAUTION! Optimizing the life of the equipment Make sure there are no obstructions in front of the ventilation openings of the system that could restrict the flow of air. A minimum of 1” (25 mm) clearance is required to insure proper ventilation.</p>
---	--

	<p>CAUTION! Generator requirements</p> <p>For proper operation and reliability of your AP6C55AA Candeo <i>SP</i> 48300 power system, AC generators should meet requirements set for in the EES “Engine Alternator Standard” document, available from EES. Contact your applicable technical support line or your local sales representative for a copy of this document (refer to the 2nd page before last of this manual for the applicable telephone number).</p>
	<p>WARNING! Short circuit hazard</p> <p>Rectifiers and batteries can deliver high current if a short to ground occurs. When working on live equipment, remove all personal jewelry, use properly insulated tools, and cover any live busbars with an insulating sheet of canvas, or other suitable insulating material, to prevent short circuits caused by falling tools or parts.</p>
	<p>CAUTION! Preventing damages to equipment</p> <p>Before starting up a newly installed AP6C55AA Candeo <i>SP</i> 48300 power system and attempting to configure the settings, make sure that all AC cables and other distribution and battery cabling have been run and connected by qualified personnel, as described in the Candeo <i>SP</i> 48300 power system installation manual, IM6C55A.</p>

1.6. Reference documents

In addition to the present manual, it is recommended that the following documentation be also available when performing the initial installation, as well as the operation and maintenance of a Candeo *SP* 48300 power system:

- installation manual IM6C55A for the Candeo *SP* 48300 power system,
- other Emerson Energy Systems manuals as required, such as UM7C76BA for the Candeo Temperature Probe Interface,
- all job specifications and drawings,

- other applicable manufacturer's installation and/or user guides (for example: batteries),
- specific Customer requirements and guidelines, if any.

2. Introduction

2.1. Description

The Candeo *SP* 48300 power system is a modular –48 V dc power system available in various configurations and capacities up to 300 A. A basic system consists of a power shelf that incorporates a basic or advanced microprocessor based controller and up to five 1500 W plug-in rectifiers, and a distribution panel with 18 plug-in positions for load protection devices and eight positions for connecting batteries with or without protection devices. A second power shelf that accommodates up to six 1500 W plug-in rectifiers and a second distribution panel with 26 plug-in positions for load protection devices can be added to increase the capacity as required. The system can operate with batteries or in the batteryless mode.

The Candeo *SP* 48300 power system is a front access system designed to be used on standard relay rack type frames or in embedded applications with standard 23” mounting, with or without batteries. The system meets Telcordia requirements for seismic zone 4 when mounted in equipment that does so (rack, cabinet, enclosure, etc.). The system is shipped from the factory with mounting brackets installed on each side of the shelves for either projected or flush mounting, as specified when ordering the system.

The Controller *SP* of the Candeo *SP* 48300 power system provides a variety of monitoring, alarm and control features normally found on power systems’ controllers, such as high and low voltage alarms, battery on discharge alarm, fuse and circuit breaker alarms, rectifier failure alarms, boost charge, load low voltage disconnect (LLVD) or battery low voltage disconnect (BLVD), temperature compensation, etc.

The System Manager *SP*, in addition to all of the Controller *SP*’s functions, provides advanced features such as configurable input/output ports, a graphical display, a charge control function, a built-in web server, etc.

The Candeo *SP* 48300 power system utilizes 1500 W rectifiers connected in parallel as building blocks to reach the maximum capacity of 300 A. The rectifiers operate from a 110/120 or 208/240 V single-phase 50/60 Hz AC

source. The controller automatically sets all the operational parameters of the rectifiers in the system as these are inserted (plugged-in). Should the controller fail or be removed from the system, the rectifiers then revert to the factory default value of 52.1 V.

Distribution is achieved through either bullet type circuit breakers or fuse blocks that plug into the distribution panel(s). One side of the protective device plugs into a main rail bus, while the other side plugs into a load clip.

2.2. Equipment applications

The Candeo *SP* 48300 power system is designed to supply a filtered and regulated -48 V dc source to any telecommunication equipment requiring up to 300 A capacity. Such equipment may include indoor or outdoor wireless radio base stations, indoor or outdoor access concentrators, customer premises, etc.

In many applications, a consistent single point ground topology should be maintained for all associated equipment. The Candeo *SP* 48300 power system complies with the requirements for single point grounding.

2.3. Configurations

The Candeo *SP* 48300 power system is available in various configurations to meet specific customer requirements.

Figure 2.1 illustrates a basic 120 A system consisting of the initial power shelf equipped with a Controller *SP* and five 1500 W rectifiers (N+1), as well as the initial distribution and battery connection panel with 18 plug-in positions for load protection devices and eight positions for batteries with or without protection devices (refer to Figure 3.6 and Figure 3.7 in the “Specification” Chapter for the configuration of the protective devices inside the panels).

Figure 2.1 – Front view of a basic 120 A Candeo *SP* 48300 power system

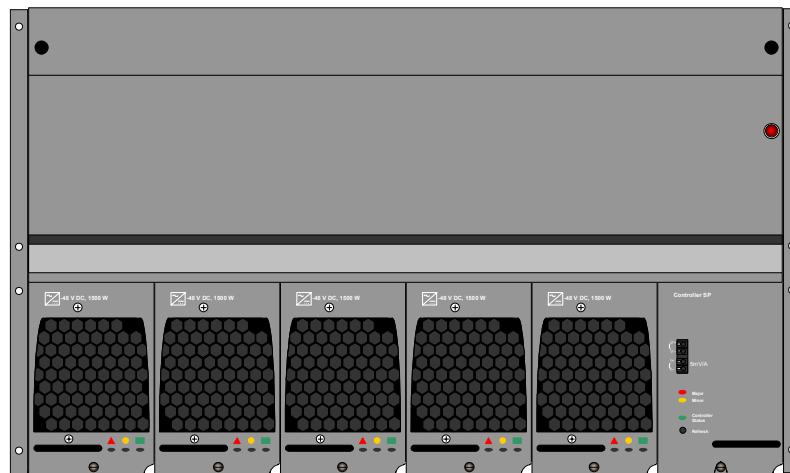


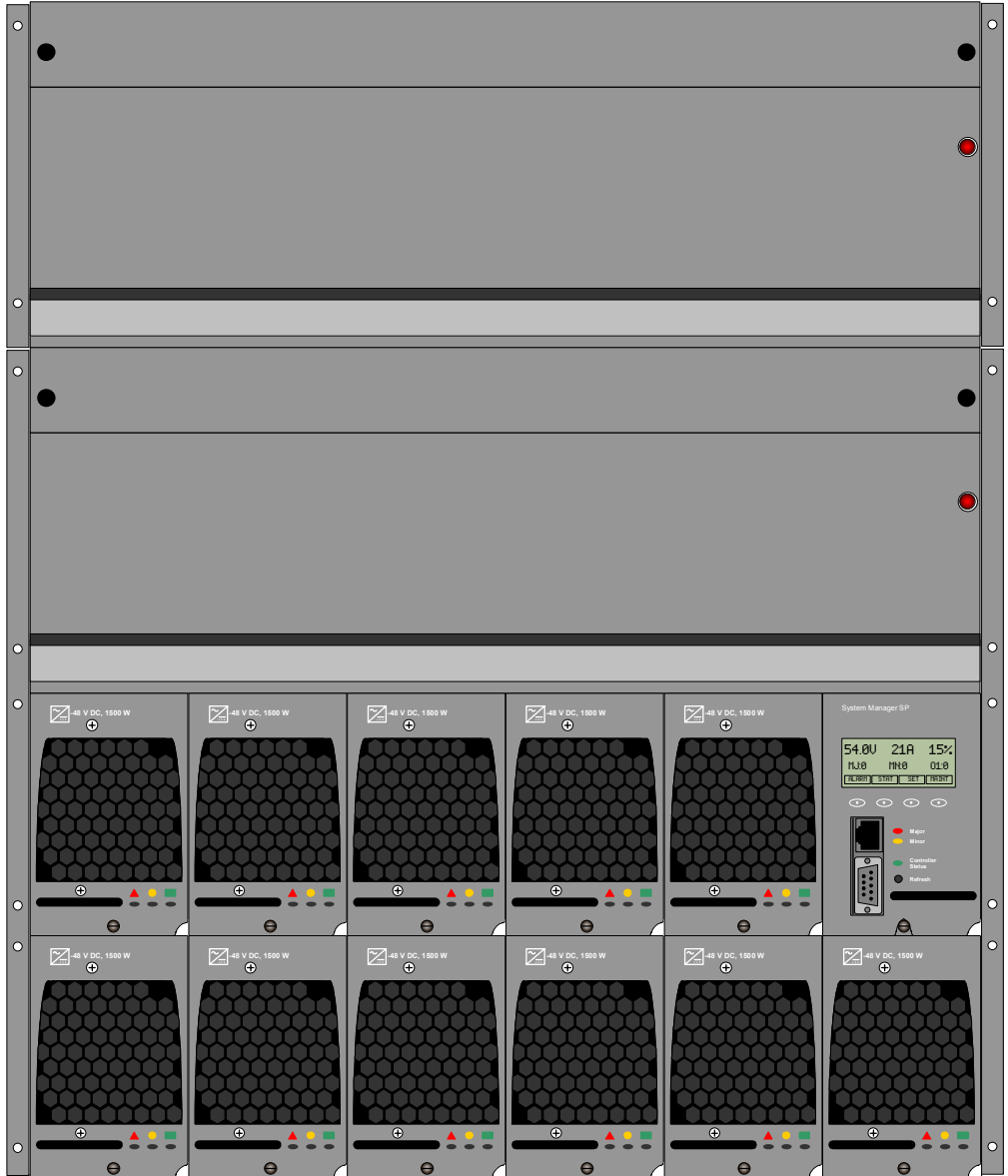
Figure 2.2 illustrates a 300 A system (N+1) consisting of the initial power shelf equipped with a System Manager *SP* and five 1500 W rectifiers, a supplementary power shelf equipped with six rectifiers, as well as the initial distribution and battery connection panel with 18 plug-in positions for load protection devices and eight positions for batteries with or without protection devices.

Figure 2.2 – Front view of a 300 A Candeco *SP* 48300 power system



Figure 2.3 illustrates a 300 A system (N+1) consisting of the initial power shelf equipped with a System Manager *SP* and five 1500 W rectifiers, a supplementary power shelf equipped with six rectifiers, the initial distribution and battery connection panel with 18 plug-in positions for load protection devices and eight positions for batteries with or without protection devices, as well as the supplementary distribution panel with 26 plug-in positions for load protection devices.

Figure 2.3 – Front view of a 300 A Candeco SP 48300 power system e/w a supplementary distribution panel



3. Specifications

3.1. General

This Chapter lists the detailed mechanical, electrical and environmental specifications for each of the individual components used in building a Candeco *SP* 48300 power system. Refer to Chapter 4 for a description of the operational features of this equipment.

3.2. Candeco *SP* 48300 controllers

Two models of microprocessor-based controllers are available with the Candeco *SP* 48300 power system:

- the Controller *SP*, with basic controller functions, and
- the System Manager *SP*, with advanced controller functions.

3.2.1. Mechanical specifications of the Candeco *SP* 48300 controllers

The mechanical specifications of the Candeco *SP* 48300 controllers are listed in the following table.

Table 3.1 – Mechanical specifications of the Candeco *SP* 48300 controllers

Model	Height	Width	Depth	Weight
Controller <i>SP</i>	132 mm	85.7 mm	224.8 mm	0.83 kg (1.82 lb)
System Manager <i>SP</i>	(5.2 in.)	(3.375 in.)	(8.85 in.)	1 kg (2.2 lb)

Figure 3.1 illustrates a front view of the Controller *SP*, while Figure 3.2 illustrates a front view of the System Manager *SP*.

Figure 3.1 – Front view of the Controller SP

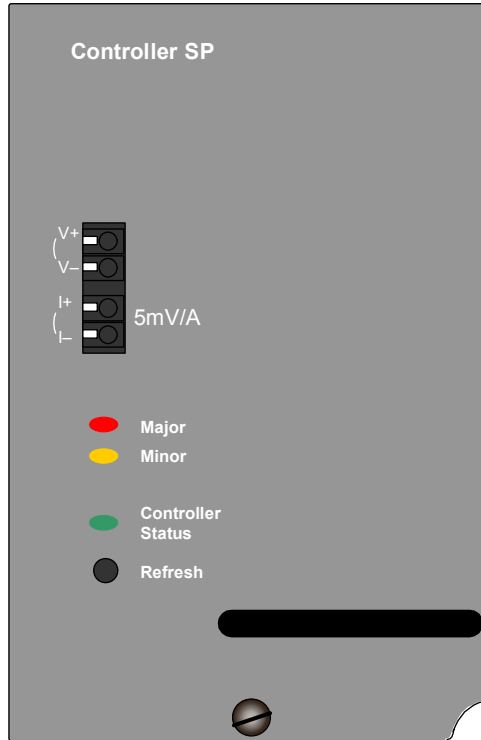
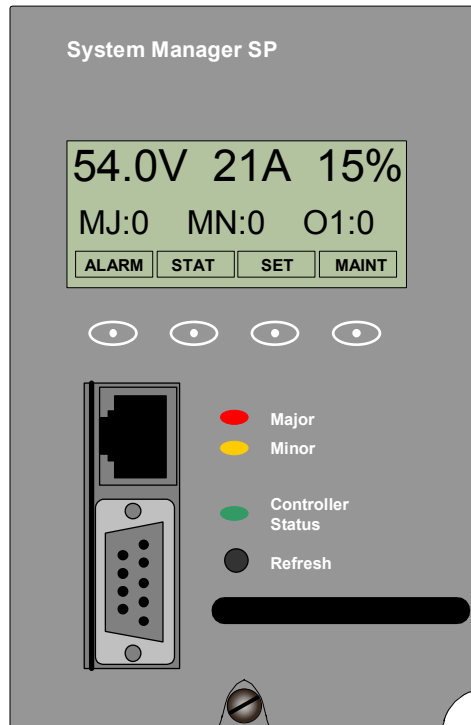


Figure 3.2 – Front view of the System Manager SP



3.2.2. Operating parameters of the Controller *SP*

The operating parameters of the Controller *SP* are as follows:

Table 3.2 – Mechanical specifications of the Controller *SP*

Parameter	Specifications
Operating voltage:	nominal: –48 V dc range: +16 to +61 V dc
Operating temperature range:	–5°C to 75°C (23°F to 167°F)
Output relay contacts:	form C, 1 A capacity at 60 V dc

Refer to Chapter 4 for the operational features of the Controller *SP*.

3.2.3. Operating parameters of the System Manager *SP*

The operating parameters of the System Manager *SP* are as follows:

Table 3.3 – Mechanical specifications of the System Manager *SP*

Parameter	Specifications
Operating voltage:	nominal: –48 V dc range: +16 to +61 V dc
Operating temperature range:	–5°C to 75°C (23°F to 167°F)
Output relay contacts:	form C, 1 A capacity at 60 V dc

Refer to Chapter 4 for the operational features of the System Manager *SP*.

3.3. Power shelves

3.3.1. Mechanical specifications of the Candeco *SP* 48300 power shelves

The mechanical specifications of the Candeco *SP* 48300 power shelves (empty) are listed in the following table.

Table 3.4 – Mechanical specifications of the Candeco *SP* 48300 power shelves

Power shelf	Height	Width	Depth	Weight
Initial power shelf (controller + five rectifiers)	133 mm	584 mm	330.2 mm	5.35 kg (11.8 lb)
Supplementary power shelf (six rectifiers)	(5.25 in.)	(23.0 in.)	(13.0 in.)	5.1 kg (11.25 lb)

Figure 3.3 illustrates a front view of an empty initial power shelf with five rectifier positions and one controller position, while Figure 3.4 illustrates a front view of an empty supplementary power shelf with six rectifier positions and the optional AC interface box for front access applications.

Figure 3.3 – Front view of an empty Candeco SP 48300 initial power shelf

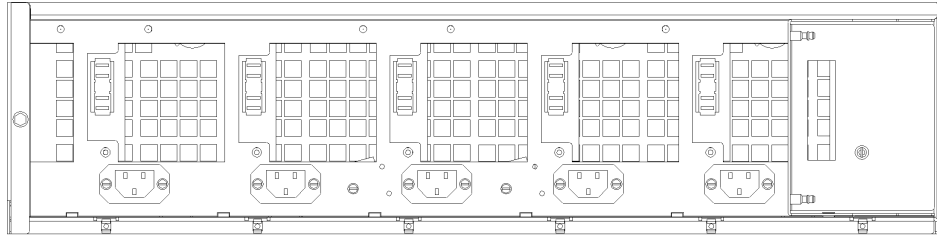
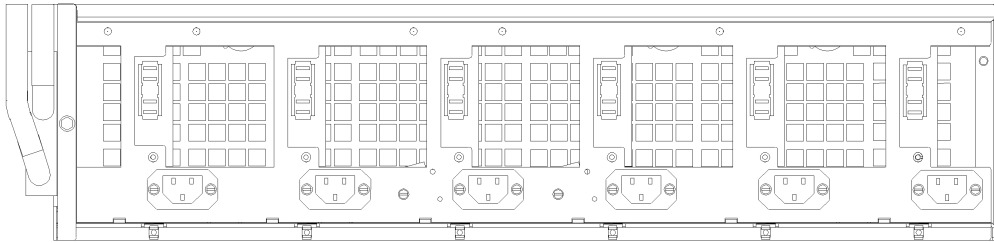


Figure 3.4 – Front view of an empty Candeco SP 48300 supplementary power shelf



3.3.2. Electrical specifications of the Candeco SP 48300 power shelves

Each rectifier position provides interconnection points for the AC input, the DC output, and the control and alarm data bus (CAN protocol).

The total output capacity is 150 amperes for the initial shelf and 180 amperes for the supplementary shelf.

Each shelf provides connecting points for dual AC feeds, one for rectifiers 1, 3 and 5, and one for rectifiers 2, 4 and 6 (note that on the initial power shelf, position No. 6 is for the controller). The AC supply can be brought into the shelf through regular knockouts at the left rear side of the shelf, or through an optional AC interface box at the front left of the shelf (front access).

3.4. Rectifier –48 V dc, 1500 W

3.4.1. Mechanical specifications of the Rectifier –48 V dc, 1500 W

The mechanical specifications of the Rectifier –48 V dc, 1500 W are listed in the following table.

Table 3.5 – Mechanical specifications of the Rectifier –48 V dc, 1500 W

Height	Width	Depth	Weight
132 mm (5.2 in.)	85.7 mm (3.375 in.)	279.4 mm (11 in.)	2.5 kg (5.52 lb)

Figure 3.5 illustrates a front view of the Rectifier –48 V dc, 1500 W.

Figure 3.5 – Front view of the Rectifier –48 V dc, 1500 W



3.4.2. Electrical specifications of the Rectifier –48 V dc, 1500 W

The electrical specifications of the Rectifier –48 V dc, 1500 W are listed in the following table.

Table 3.6 – Electrical specifications of the Rectifier –48 V dc, 1500 W

Parameter	Specifications
Input voltage:	110/120 or 208/240 V ac, single phase, 45 to 65 Hz Input voltage range: 75 to 310 V ac
Input current:	7.2 A nominal at 230 V ac input and –50 V dc, 1500 W output, 8 A nominal at 100 V ac input and –50 V dc, 750 W output, 9 A maximum current.
Recommended AC service input:	30 A, 2-pole AC circuit breaker per feed (three rectifiers) for 208/240 V supply (phase to phase) 30 A, single-pole AC circuit breaker per feed (three rectifiers) for 110/120 V supply (phase to neutral)
Output voltage:	Nominal: 48.0 V dc Range: –43.0 to –58.5 V dc Factory setting: 52.1 V dc
–continued–	

Output power:	1500 W nominal per rectifier, from 200 V ac to 310 V ac, with absolute current limiting at 34 A Output power is derated to 1350 W maximum from 176 V ac to 200 V ac, to 60% at 120 V ac, to 50% at 100 V ac and to 0% at voltages below 85 V ac.
Input and output protection:	Internal fuses
Output over voltage protection:	Hardware HVSD factory-set at 60.0 V dc Software-adjustable HVSD, range from 56.0 to 59.0 V dc, default at 57.5 V dc
Efficiency:	91.5% at 80% load and 230 V ac input voltage 91%, from 40% to 100% load, at a 230 V ac input voltage 85%, from 50% to 100% load, at a 120 V ac input voltage.
Power factor:	Power factor is >0.99 from 40% to 100% load
Total Harmonic Distortion (THD):	Less than 10% from 40% to 100% load.
Output noise:	Less than 10 mV rms in 3 kHz bands from 10 kHz to 20 MHz.
Operational temperature:	Normal operation from -40°C (-40°F) to 55°C (131°F); output power is linearly derated from 1500 W to 1200 W between 55°C (131°F) and 65°C (149°F), and from 1200 W to 0 W between 65°C (149°F) and 75°C (167°F).
Heat dissipation:	148.3 W (506.5 Btu/hr) at 1500 W output, 230 V ac input

3.5. Distribution panels

Two models of distribution panels are available for the Candeco *SP* 48300 power system:

- the initial panel, equipped with 18 position for load protective devices (circuit breakers or fuses), eight positions for battery protective devices or a battery connection kit, a battery current shunt, and an optional LVD circuit factory-wired for either load disconnect (LLVD) or battery disconnect (BLVD), and
- the supplementary panel, equipped with 26 positions for load protective devices (circuit breakers or fuses).

In a Candeco *SP* 48300 distribution panel, a single load clip can accommodate single-pole circuit breakers or fuse blocks sized from 1 to 60 A and lugs for cable sizes up to No. 2, while a double load clip can accommodate single-pole circuit breakers or fuse blocks sized from 65 to 100 A or 150 A double-pole circuit breakers and lugs for cable sizes up to No. 2/0. The circuit breakers can be of the mid-trip or series-trip type; a mechanical jumper on the distribution panel allows selection of the appropriate alarm type (see Figure 7.6 in the “Maintenance” Chapter).

An optional 10-position fuse kit, which does not require load clips, can accommodate fuses from 0 to 10 A for small loads.

At temperatures up to 50°C, observe the requirements per the following notes. At temperatures between 50°C and 65°C, the protective devices should be derated as described in section 3.5.2.

Note 1: When 65 to 100 A circuit breakers or fuses are used, the double load clips are installed side-by-side but all circuit breakers or fuses shall be on the same side of the clips to insure that there is an empty space between adjacent circuit breakers or fuses. Small red caps are available to insert into the empty holes on the load clips and on the main bus.

Note 2: When 150 A circuit breakers are used, there shall be one empty space between adjacent load clip/circuit breaker assemblies. Small red caps are available to insert into the empty holes on the main bus.

Note 3: Do NOT mix standard trip and mid-trip circuit breakers, or standard trip circuit breakers with fuses (except a 10-position fuse kit) on the same bus within a distribution panel. Note that on the initial distribution panel, the load bus and the battery bus are separate busses.

Note 4: Do NOT use two 1 to 60 A circuit breakers or fuses on the same double load clip.

Note 5: Bussmann type TPS fuses shall be used for 1 to 70 A loads. Littlefuse type TLS fuses shall be used for 100 A loads.

Note 6: Use only San-O brand AX-1 fuses in the 10-position fuse kit.

Note 7: On a 10-position fuse kit, the largest loads must be installed starting from bottom of the block (F1), going to the smaller loads towards the top of the block (F10), and leaving an empty space (dummy fuse) above fuses larger than 5 A (ex.: 7.5 A and 10 A). The maximum total current allowed on the fuse block is 40 A.

3.5.1. Mechanical specifications of the Candeco SP 48300 distribution panels

The mechanical specifications of the Candeco SP 48300 distribution panels are listed in the following table.

Table 3.7 – Mechanical specifications of the Candeco SP 48300 distribution panels

Panel	Height	Width	Depth	Weight
Initial	177.8 mm (7.0 in.)	584 mm (23.0 in.)	343 mm (13.5 in.)	12.5 kg (27.5 lb) with LVD,
				11.0 kg (24.25 lb) without LVD
Supplementary				11.0 kg (24.25 lb)

Figure 3.6 illustrates a front view inside an initial Candeco SP 48300 distribution panel, while Figure 3.7 illustrates a front view inside a supplementary Candeco SP 48300 distribution panel (both shown with front cover open).

Figure 3.6 – Front view inside an initial Candeco SP 48300 distribution panel

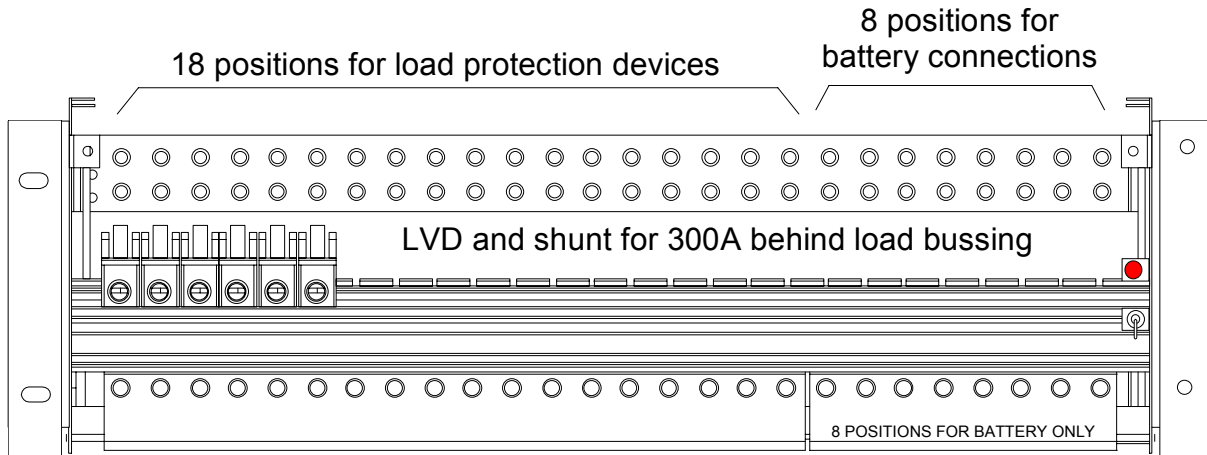
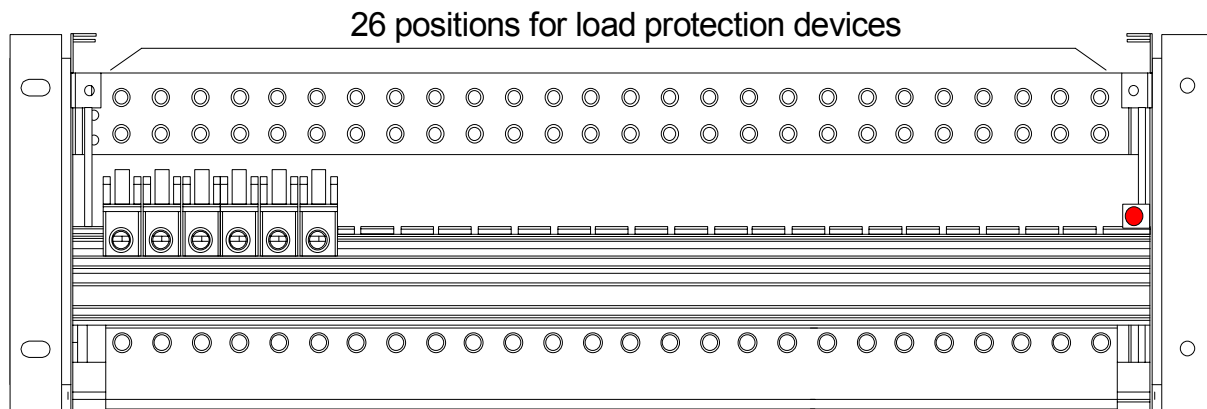


Figure 3.7 – Front view inside a supplementary Candeco SP 48300 distribution panel



3.5.2. Electrical specifications of the Candeco SP 48300 initial distribution panel

The electrical specifications of the Candeco SP 48300 initial distribution panel are as follows (see also notes 1 to 7 in section 3.5):

Table 3.8 – Electrical specifications of the Candeco SP 48300 initial distribution panel

Parameter	Specifications
internal busbar capacity:	charge: 330 A, up to 50°C (with excursions up to 65°C allowed), 200 A if operated continuously at temperature between 50°C and 65°C discharge: 300 A, up to 50°C (with excursions up to 65°C allowed), 200 A if operated continuously at temperature between 50°C and 65°C
shunt rating (75 mV drop):	500 A
–continued–	

LVD (optional) capacity:	400 A
LVD operating voltage:	nominal: –48.0 V dc range: –40.0 to –58.5 V dc
number of load protective devices:	up to 18
number of battery protective devices (if used):	up to 8
capacity range of circuit breakers:	1-150 A
capacity range of main fuses:	1-100 A
main fuse type:	TPS or TLS
AX1 fuse rating (optional 10-position fuse kit):	0.180 A to 10 A

Protective device configurations for the loads (up to 50°C):

- up to 18 single-pole 1 A to 60 A circuit breakers or fuse blocks, or
- up to nine single-pole 65 A to 100 A circuit breakers or fuse blocks, or
- up to six double-pole 150 A circuit breakers, or
- up to six 10-position fuse kits that can each contain 10 fuses ranging from 0.180 A to 10 A, or
- any combination of the above, as long as the rules per notes 1 to 7, in Section 3.5, are observed, and that the maximum discharge capacity of the panel is not exceeded.

Note: No protective device larger than 50 A (loaded at 40 A maximum) shall be used for continuous operation at temperatures between 50°C and 65°C.

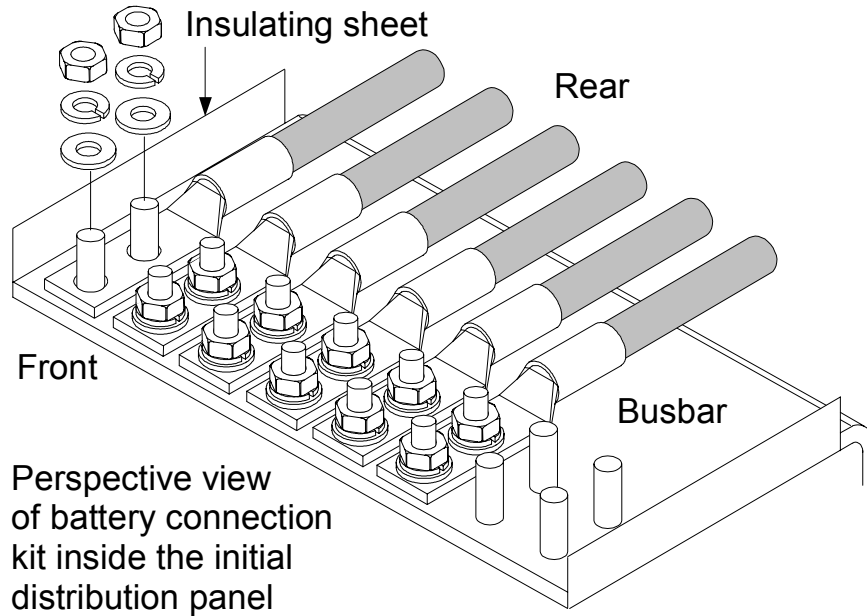
Protective device configurations for the batteries:

- up to eight single-pole 1 to 100 A circuit breakers or fuses, or
- up to four double-pole 150 A circuit breakers,

Note 1: The protective devices for the batteries can be placed side by side regardless of their capacity, but shall **not** be loaded at more than 50% of their nominal capacity.

Note 2: If no protective devices are desired to protect the batteries, an optional factory-installed (not field installable) battery connection kit, made of a specially designed busbar with studs to connect the battery strings and bullets that connect into the main –48 V bus, can be installed in place of the circuit breakers (see Figure 3.8).

Figure 3.8 – Battery connection kit shown with some battery cables connected



3.5.3. Electrical specifications of the Candeco *SP 48300* supplementary distribution panel

The Candeco *SP 48300* supplementary distribution panel has no shunt and no LVD option, and the protective device configurations are as follows. The other electrical specifications are identical to that of the initial distribution panel.

- up to 26 single-pole 1 A to 60 A circuit breakers or fuse blocks, or
- up to 13 single-pole 65 A to 100 A circuit breakers or fuse blocks, or
- up to nine double-pole 150 A circuit breakers, or
- up to nine 10-position fuse kits that can each contain 10 fuses ranging from 0.180 A to 10 A, or
- any combination of the above, as long as the rules per notes 1 to 7, in Section 3.5, are followed, and that the maximum discharge capacity of the panel is not exceeded.

Note: No protective device larger than 50 A (loaded at 40 A maximum) shall be used for continuous operation at temperatures between 50°C and 65°C.

4. Functional description

4.1. General

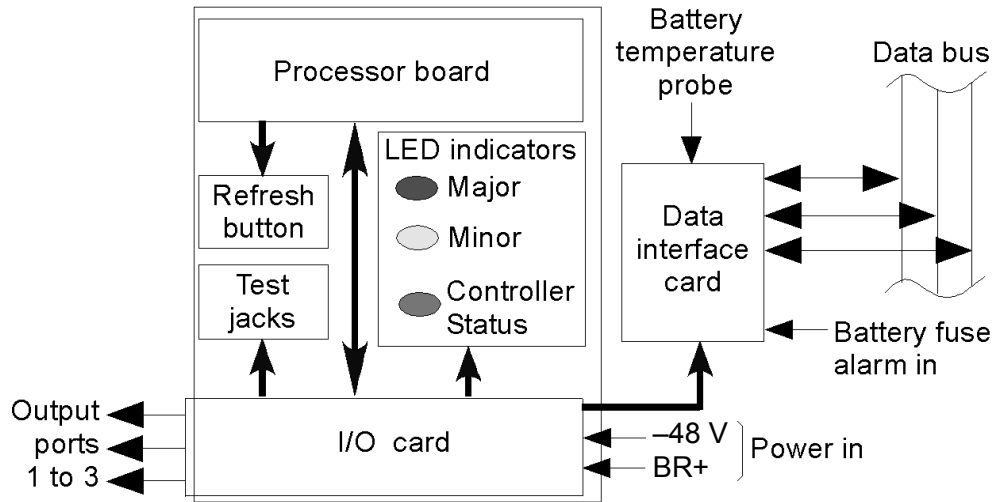
This Chapter provides a functional description of the components used in making a Candeo power system.

4.2. Controller *SP*

The Controller *SP* is the basic controller available with the Candeo *SP* 48300 power systems. The operational features of the Controller *SP* are as follows:

- local alarm display by means of three LED indicators,
- three alarm outputs (dry C contacts),
- two sets of local test points for the measurement of the system's voltage and current,
- nominal float voltage (adjustable by means of DIP switches),
- temperature compensation (adjustable by means of DIP switches),
- optional low voltage disconnect (adjustable by means of DIP switches),
- CAN protocol communication with up to 30 mixed modules,
- field replaceable without interruption of the rectifiers,
- retains operational parameters during shutdown.

Figure 4.1 illustrates the functional diagram of the Controller *SP*.

Figure 4.1 – Functional diagram of the Controller *SP*

4.2.1. Input/output (I/O) interface

The input/output interface on the Controller *SP* consists of:

- one input port for the detection of external alarm:
- three output ports driven by relays with dry-C contacts (see Figure 5.1 for the specific position of these dry-C contacts):
 - Major alarms (MJ)
 - Minor alarms (MN)
 - Observation alarms (O1): AC supply failed or out of range, or ongoing Battery On Discharge alarm, or ongoing Low Voltage alarm

Note: The Major output dry-C contact is fail-safe. In case of a power failure, it will be released, providing continuity through the normally close contact and open circuit through the normally open contact.

4.2.2. Alarms

The Controller *SP* displays its own operating status by means of the “Controller Status” LED indicator located on the front panel.

- Green means that the unit is operating normally.
- Red means that the unit is not operating normally.

It also displays the system alarms by means of the “Minor” and “Major” LED indicators also located on the front panel (refer to Table 7.1):

- the yellow Minor LED indicates that there is one or more minor alarm(s) activated in the system, but no major alarm,

- the red Major LED indicates that there is one or more major alarm(s) activated in the system.

Refer to Figure 3.1 for the specific location of the LED indicators also located on the front panel.

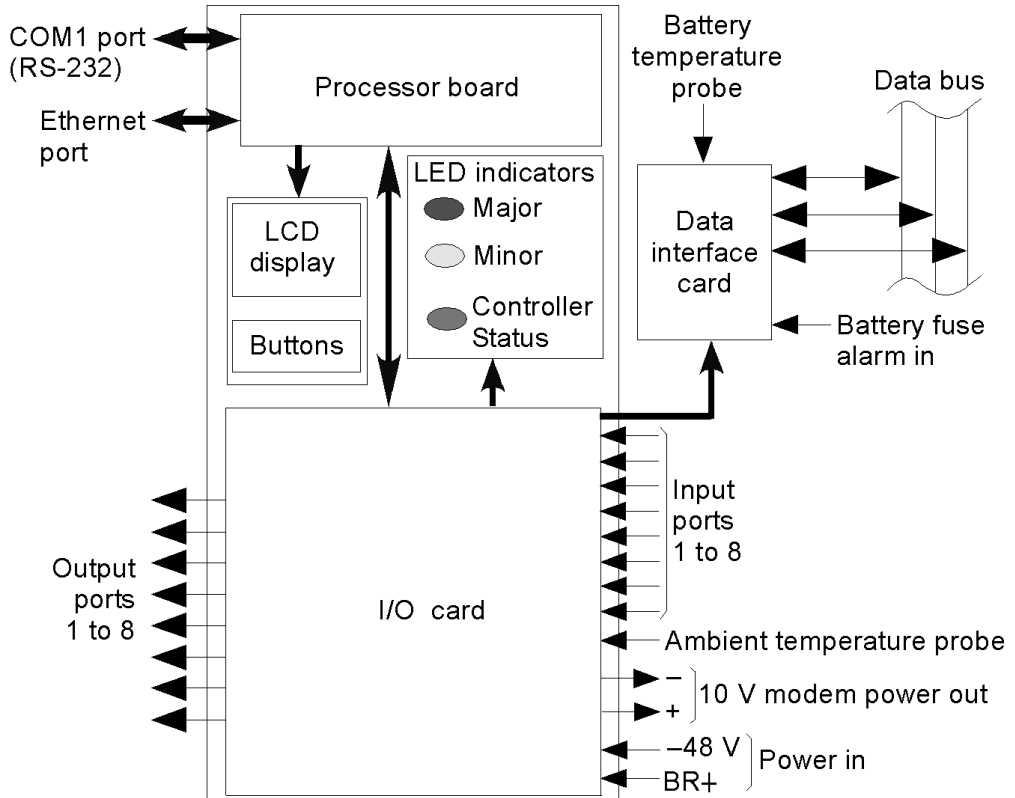
4.3. System Manager *SP*

The System Manager *SP* is the advanced controller available with the Candeco *SP* power systems. The operational features of the System Manager *SP* are as follows:

- graphical LCD screen,
- local alarm display by means of LED indicators,
- 8 programmable alarm outputs (dry-C contacts), Minor, Major and Observation being the factory defaults for outputs 1, 2 and 3,
- 8 programmable alarm inputs,
- several processed alarms,
- alarms and events history files,
- alarm management,
- built-in web server,
- Ethernet (LAN) and modem (RS-232) access,
- four levels of access security (one hardware and four passwords),
- battery database,
- temperature compensation,
- voltage boost (equalize),
- battery discharge test,
- charge control,
- delivered DC power calculation,
- CAN protocol communication with up to 30 modules,
- maintains an inventory of the units in the system,
- field replaceable without interruption of the rectifiers,
- remote or local access (PSTN, GSM, EEM, TCP/IP, SNMP)
- local Graphical User Interface (GUI) with multilanguage compatibility, and
- remote Graphical User Interface with multilanguage compatibility.

Figure 4.2 illustrates the functional diagram of the System Manager *SP*.

Figure 4.2 – Functional diagram of the System Manager *SP*



4.3.1. Input/output (I/O) interface

The input/output interface on the System Manager *SP* consists of:

- Eight user-programmable input ports, each capable of detecting the presence or absence of a battery or battery return signal.
- Three fixed and five user-programmable output ports, each providing C form contacts (rated 1 A at 60 V dc) that can be used to perform specific functions or for alarm notification, as desired by the end user.

4.3.2. Alarms

The System Manager *SP* displays its own operating status by means of the “Controller Status” LED indicator located on the front panel.

- Green means that the unit is operating normally.
- Red means that the unit is not operating normally.

It also displays the system alarms by means of the “Minor” and “Major” LED indicators, also located on the front panel:

- the yellow Minor LED indicates that there is one or more minor alarm(s) activated in the system, but no major alarm,
- the red Major LED indicates that there is one or more major alarm(s) activated in the system.

Refer to Figure 3.2 for the specific location of the LED indicators located on the front panel.

Figure 4.3 – List of available alarms and their default severity

Change Alarm Severity:

Alarm Number	Alarm Name	Alarm Severity	Alarm LED
23	<u>Ambient Temperature Probe Fail</u>	MINOR	Yellow
84	<u>Automatic Voltage Boost in progress</u>	OBSERVATION	Yellow
72	<u>Bad Battery Alarm</u>	MINOR	Yellow
161	<u>Charge Control in progress</u>	OBSERVATION	Yellow
35	<u>Battery Shunt Fault</u>	MINOR	Yellow
34	<u>Battery Temperature Probe Fail</u>	MINOR	Yellow
66	<u>Battery Fuse Alarm</u>	MAJOR	Red
73	<u>Battery Test Fail</u>	MINOR	Yellow
1	<u>Communication Fail</u>	MINOR	Yellow
75	<u>Cyclic Battery Test in progress</u>	OBSERVATION	Yellow
83	<u>Cyclic Voltage Boost in progress</u>	OBSERVATION	Yellow
56	<u>Rectifier Fan Fail</u>	MINOR	Yellow
21	<u>High Ambient Temperature</u>	MINOR	Yellow
162	<u>High Battery Current</u>	MINOR	Yellow
32	<u>High Battery Temperature</u>	MAJOR	Red
58	<u>High Voltage ShutDown (HVSD)</u>	MAJOR	Red
22	<u>Low Ambient Temperature</u>	MINOR	Yellow
33	<u>Low Battery Temperature</u>	MINOR	Yellow
76	<u>Automatic Battery Test in progress</u>	OBSERVATION	None
11	<u>Main AC Fail</u>	MAJOR	Red
74	<u>Manual Battery Test in progress</u>	OBSERVATION	Yellow
82	<u>Manual Voltage Boost in progress</u>	OBSERVATION	Yellow
52	<u>Rectifier Fail Major (RFA major)</u>	MAJOR	Red
64	<u>Contactor Fail</u>	MINOR	Yellow
152	<u>Secondary Fuse Alarm (FA)</u>	None	None
62	<u>Low Voltage Disconnect (LVD)</u>	MAJOR	Red
2	<u>Opto Communication Fail</u>	None	None
41	<u>High Voltage (HV)</u>	MAJOR	Red
65	<u>Priority Contactor Fail</u>	MINOR	Yellow
153	<u>Fuse Alarm (FA)</u>	MAJOR	Red
63	<u>Priority Low Voltage Disconnect</u>	MAJOR	Red
55	<u>AC Input Overvoltage</u>	MAJOR	Red
51	<u>Rectifier Fail Minor (RFA minor)</u>	MINOR	Yellow
54	<u>Rectifier High Temperature</u>	MINOR	Yellow
12	<u>Rectifier AC Fail</u>	MAJOR	Red
53	<u>Rectifier Power Limit</u>	MINOR	Yellow
105	<u>Remote Shut Down</u>	MAJOR	Red
68	<u>System Manager SP Fail</u>	MAJOR	Red
67	<u>Calibration Fail</u>	MINOR	Yellow
69	<u>Configuration Fail</u>	MAJOR	Red
42	<u>Battery On Discharge (BOD)</u>	MAJOR	Red
43	<u>Low Voltage (LV)</u>	MAJOR	Red
5	<u>Module Not Responding</u>	MINOR	Yellow
31	<u>Very High Battery Temperature</u>	MAJOR	Red

4.3.3. Access

The System Manager *SP* can be accessed in several ways to monitor the operating status and the alarms on the system, view and modify the operating parameters, download configuration files and software upgrades, etc.:

- local access by means of the display and the four buttons under the display on the front of the unit,
- local access with a computer equipped with a web browser and connected locally into the RJ45 Ethernet port through a crossover Ethernet cable,
- remote access with a computer equipped with a web browser and connected remotely through a dial-up network connection into the RS-232 port via an external modem,
- remote access with a computer equipped with a web browser and connected remotely through a LAN or WAN network connection into the RJ45 Ethernet port.

4.4. Rectifier –48 V dc, 1500 W

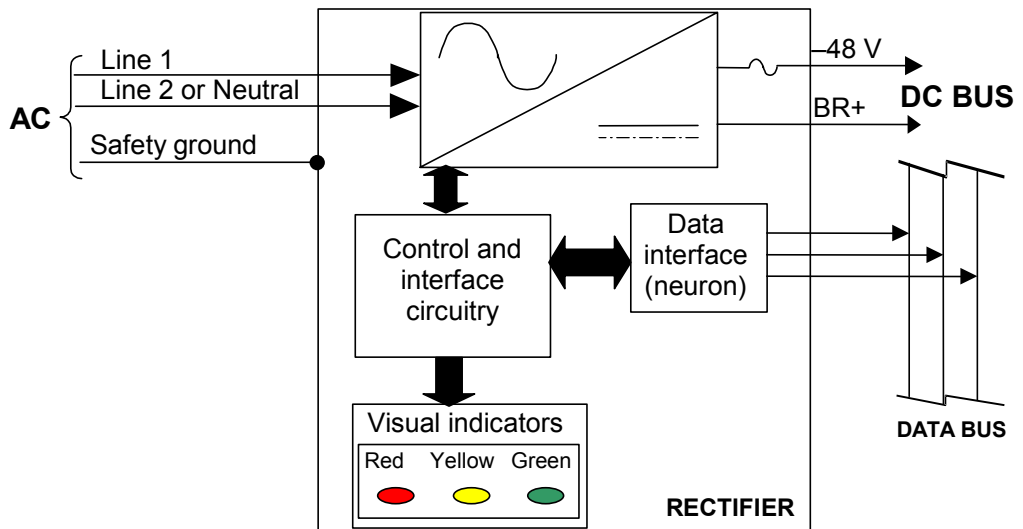
The Rectifier –48 V dc, 1500 W is a switch-mode rectifier that converts the single-phase AC source at the input into an isolated, filtered, and regulated DC power output used to feed the loads and to charge a positive grounded battery. These rectifiers are of the plug-in type to facilitate their installation, maintenance, replacement, and repair. Each rectifier is equipped with a cooling fan that is field replaceable; refer to Appendix A for the ordering part number, and to the “Maintenance” Chapter for the replacement procedure.

The rectifier requires no adjustments. Under normal operation, operating parameters of the rectifiers in a system, such as float voltage and boost voltage, are entirely set and controlled by the Controller *SP* or System Manager *SP* from the moment the system is started-up or rectifiers are inserted into a working system.

If the controller fails or is removed from a working system, or if the data communication link is lost between the controller and the rectifiers, or if a new rectifier is inserted into a working system without a controller or a data communication link, the rectifier(s) will automatically revert to the 52.1 V default value.

Figure 4.4 illustrates the functional diagram of a Rectifier –48 V dc, 1500 W.

Figure 4.4 – Functional diagram of the Rectifier –48 V dc, 1500 W



4.4.1. Alarms

The Rectifier –48 V dc, 1500 W is equipped with three LED indicators located on the front panel to display unit status and alarm conditions as described in the following Table.

Table 4.1 – Status and alarm indicators on the Rectifier –48 V dc, 1500 W

LED	Status
Solid Red	Rectifier failure due to one or more of the following alarm conditions: output fuse blown, high voltage shutdown, or internal rectifier circuitry failure.
Flashing Red and solid Yellow	Cooling fan failure.
Yellow	The rectifier is still operating, but with one or more of the following alarm conditions active: high temperature condition, power limiting, AC over voltage.
Solid Green	The rectifier is operating normally.
Flashing Green	Ongoing initialization or no CAN communication.
No LED lit	No AC power at the input.

4.5. Distribution panels

The distribution panels are used to connect small and medium capacity distribution loads. They can accommodate a wide variety of distribution hardware in various configurations (see sections 3.5.2 and 3.5.3 in the previous Chapter). Both the initial and supplementary distribution panels provide local fuse and/or circuit breaker alarm indication by means of a red LED indicator.

In addition to providing protection and connecting points for the battery and battery return cables for the loads, the initial distribution panel provides:

- a connecting point for the system's main battery return reference (BRR) cable,
- connecting points for the busbar links to bridge the supplementary distribution panel, if provided,
- connecting points for the bridge cables for a field-installed supplementary rectifier shelf, if provided,
- connecting points for the interface with the outside world (alarms inputs and outputs, etc.), and
- if the LVD option was furnished, an LVD contactor inhibit switch.

5. Configuring and operating the system

5.1. General

The Candeo *SP* 48300 power system uses a microprocessor-based controller. On the Controller *SP*, there are some settings that require hardware adjustments by means of DIP switches. On the System Manager *SP*, there are absolutely no hardware based adjustments, such as potentiometers or switches; all adjustments and controls are software driven. Some can be set by navigating locally through the controller menus by using the screen and push buttons on the unit, while all can be set by navigating remotely through the web-based remote graphical user interface (GUI) by using a computer locally or remotely connected in one of the ports on the unit.

The controller, upon insertion of the rectifiers, automatically sets the float voltage of the rectifiers in the system. However, should the controller fail or be removed from the system, or the communication be lost between the controller and the rectifiers, these then revert to the factory-set default value of -52.1 V.

The controller communicates with all the modules in the system through a data bus using the CAN protocol.

5.2. Voltage levels

Operating and alarm voltage levels for the Candeo *SP* 48300 power systems are dependent upon the type of batteries being used with the system and whether the temperature compensation function is used or not. Refer to user manual 167-7011-010 for some recommended voltage levels for specific type of batteries with or without temperature compensation.

For non-listed battery types, refer to the battery manufacturer's specifications and recommendations. Refer also to the customer specifications and requirements.

5.3. Controller SP

Configure a Candeco SP 48300 power system equipped with a Controller SP as described in the following subsections.

Note 1: Each time the configuration of one or more DIP switch modules is changed, the “Refresh” button, located on the front panel of the Controller SP, must be depressed for at least 5 seconds in order for the new configuration and associated values to be validated and become operational.

Note 2: The factory default settings of the DIP switches are shown in the shaded lines in Table 5.2, Table 5.3 and Table 5.4.

5.3.1. DIP switch modules

Three DIP switch modules (S1, S2 and S3), located on the upper edge of the Controller SP, are used to set the thresholds of functions as illustrated in Figure 5.1 and as described in Table 5.1, Table 5.2, Table 5.3 and Table 5.4.

Figure 5.1 – Location of DIP switch modules and output relay contacts on Controller SP

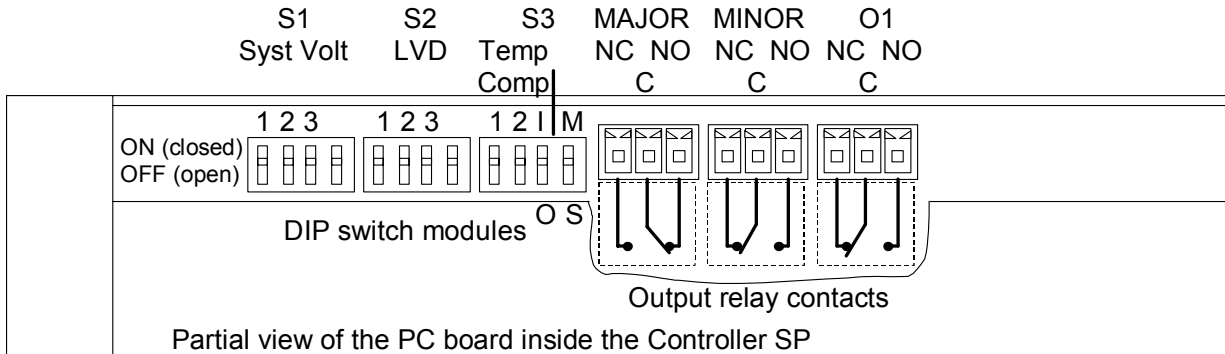


Table 5.1 – DIP switch modules definition

Designation	Function
S1	Used to select the nominal float voltage.
S2	Used to select the low voltage disconnect (LVD) threshold.
S3	Used to activate the temperature compensation (TC) and select the slope (M/S switch is for a future enhancement).

5.3.2. Nominal float voltage adjustment

The nominal float voltage can be adjusted by means of the S1 DIP switch module. Refer to Figure 5.1, Table 5.1 and Table 5.2 for the switch selection applicable to the desired float voltage. Use an external multimeter connected to the V+ and V– test jacks on the front panel of the Controller SP (refer to Figure 3.1) to monitor the voltage while making the adjustment.

Table 5.2 – Nominal float voltage settings (S1)

Nominal Float Voltage Settings	S1-1	S1-2	S1-3	S1-4
–48.0 V dc	Open	Open	Open	x
–51.0 V dc	Open	Open	Closed	x
–52.0 V dc	Open	Closed	Open	x
–53.0 V dc	Open	Closed	Closed	x
–54.0 V dc	Closed	Closed	Closed	x
–54.5 V dc	Closed	Open	Closed	x
–55.0 V dc	Closed	Closed	Open	x

Note 1: The setting in the shaded line is the factory default setting.

Note 2: The “x” means that the position of that switch does not matter.

5.3.3. Low voltage disconnect

The Controller *SP* operates the low voltage disconnect contactor and generates an LVD alarm when the voltage reaches the selected low voltage disconnect level. If the low voltage disconnect contactor is wired for load disconnect, it will completely disconnect the load (LLVD). If the low voltage disconnect contactor is wired for battery disconnect, it will completely disconnect the batteries (BLVD). As the voltage rises back to normal float value, the LVD condition and alarm should disappear when the system voltage reaches –50.5 V dc.

The low voltage disconnect level can be adjusted by means of the S2 DIP switch module. Refer to Figure 5.1, Table 5.1 and Table 5.3 for the switch selection applicable to the desired low voltage disconnect level.

Table 5.3 – Low voltage disconnect settings (S2)

Low voltage disconnect settings	S2-1	S2-2	S2-3	S2-4
–40.0 V dc	Open	Open	Open	x
–42.0 V dc	Open	Open	Closed	x
–42.5 V dc	Open	Closed	Open	x
–43.0 V dc	Open	Closed	Closed	x
–43.5 V dc	Closed	Closed	Closed	x
–44.0 V dc	Closed	Open	Open	x
–44.5 V dc	Closed	Open	Closed	x
–45.0 V dc	Closed	Closed	Open	x

Note 1: The setting in the shaded line is the factory default setting.

Note 2: The “x” means that the position of that switch does not matter.

5.3.4. Temperature compensation

The Controller *SP* has a temperature compensation function for adjusting the float voltage of the rectifiers as a function of the temperature, in order to optimize the charging of VRLA batteries and to prevent premature ageing.

The temperature compensation slope can be adjusted by means of the S3 DIP switch module. Refer to Figure 5.1, Table 5.1 and Table 5.4 for the switch selection applicable to the desired temperature compensation slope.

Table 5.4 – Temperature compensation slope settings (S3)

Temperature compensation slope voltage settings	S3-1	S3-2	S3-3
48 mV/°C	Open	Open	Closed
72 mV/°C	Closed	Closed	Closed
120 mV/°C	Open	Closed	Closed
144 mV/°C	Closed	Open	Closed
Temperature compensation OFF	x	x	Open

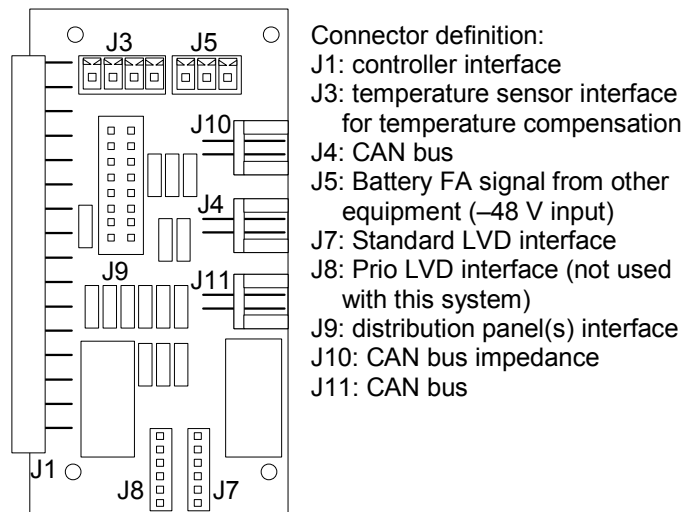
Note 1: The reference temperature (T_{ref}) is 20°C.

Note 2: The setting in the shaded line is the factory default setting (providing the probe is installed).

Note 3: The “x” means that the position of that switch does not matter.

To enable the temperature compensation function, the required battery temperature probe must be mounted on the battery and connected to connector J3 in the controller connection interface box located inside the initial power shelf, as illustrated in Figure 5.2.

Figure 5.2 – Connector definition in the controller connection interface box



5.3.5. Clearing of alarms

Refer to the “Troubleshooting” section of the “Maintenance” Chapter for the instructions on how to clear alarms.

Note 1: If a module has been removed from the system and an alarm associated with this module still appears on the Controller *SP*, this alarm must be cleared to erase it and reset the list of alarms. After the reset, ongoing alarm conditions on active modules will still appear on the Controller *SP*, but any alarms associated with removed modules will no longer be displayed. To do an alarm reset, press and hold the “Refresh” button for 5 seconds.

Note 2: The Major output relay operates in the safe mode; it is activated when there are no alarm conditions and released when there is one or more alarm condition(s).

5.4. System Manager *SP*

You can set up, operate and maintain the Candeco *SP* 48300 power system through the System Manager *SP* by navigating through the various menus, either:

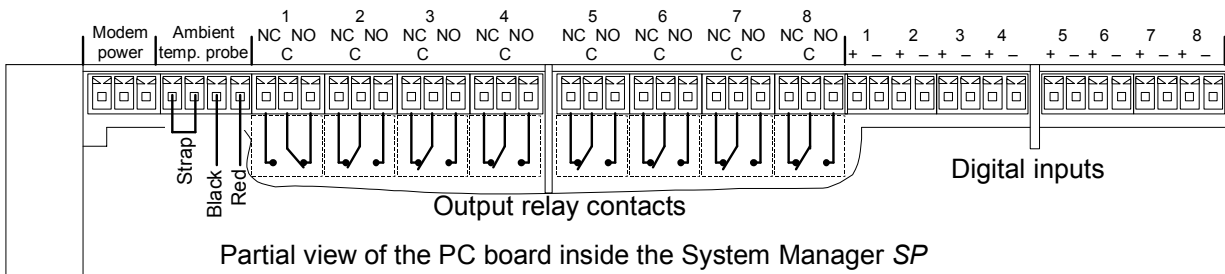
- directly on the unit, by using the four push buttons located below the screen and the screen itself, or
- on a computer locally or remotely connected to one of the communication ports.

For information on how to access the GUI of the System Manager *SP* with a computer, refer to the subsection titled “Communicating with the System Manager *SP* remotely” further in this section.

5.4.1. Input/output connection interface

The connectors to interface with the digital inputs and the relay outputs are located on the upper edge of the System Manager *SP* as illustrated in Figure 5.3.

Figure 5.3 – Input/output connection interface the on System Manager *SP*



Note: To enable the temperature compensation function of the System Manager *SP*, a battery temperature probe located on the battery **must** be connected to connector J3 in the controller connection interface box located inside the initial power shelf (see Figure 5.2). An optional ambient temperature probe may also be connected to the “Ambient temp. probe” connector of the System Manager *SP* shown in the above illustration. This probe is not required to enable the temperature compensation function, but it provides an “Ambient Temperature” alarm (default is 65°C).

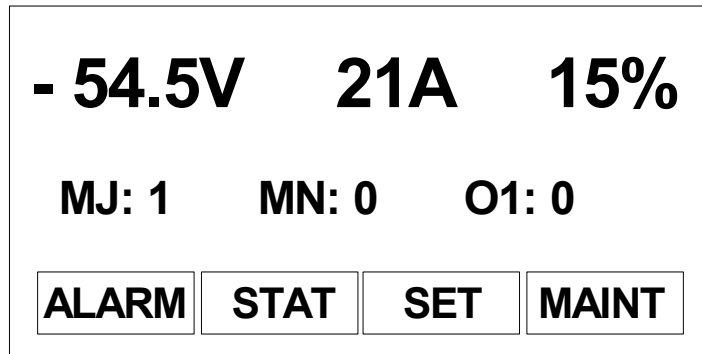
5.5. Local access to the System Manager *SP*

The System Manager *SP* is accessible directly by means of the four push-buttons located below the screen and the screen itself. Refer to the right illustration of Figure 3.2.

5.5.1. Initial start-up

When the System Manager *SP* is started for the first time, after going through the initialization routine, it displays the default screen illustrated in Figure 5.4.

Figure 5.4 – Default screen on System Manager *SP* graphical display




Four main menus called ALARM, STATUS, SETTINGS and MAINTENANCE are then accessible by clicking on the associated push-button below the LCD screen.

Note: The number of active alarms is indicated besides each alarm severity indication (one active major alarm and no active minor or observation (O1) alarms in the default screen example shown in Figure 5.4).

5.5.2. Inactivity timer

While navigating through the various menus, if no button is pushed for 3 minutes, the backlight of the LCD display extinguishes. If no button is pushed for 5 minutes, the System Manager *SP* returns to the default screen illustrated in Figure 5.4. If no button is pushed for the time period programmed in the “SETTINGS/DIP AUTOOFF” screen in the Settings menu (see Figure 5.7), the LCD display extinguishes.

5.5.3. Navigating through the menus

Use the four push-buttons to scroll through the various screens of the four submenus illustrated in Figure 5.5 to Figure 5.8. The  button is always used to go back to the previous menu or submenu screen.

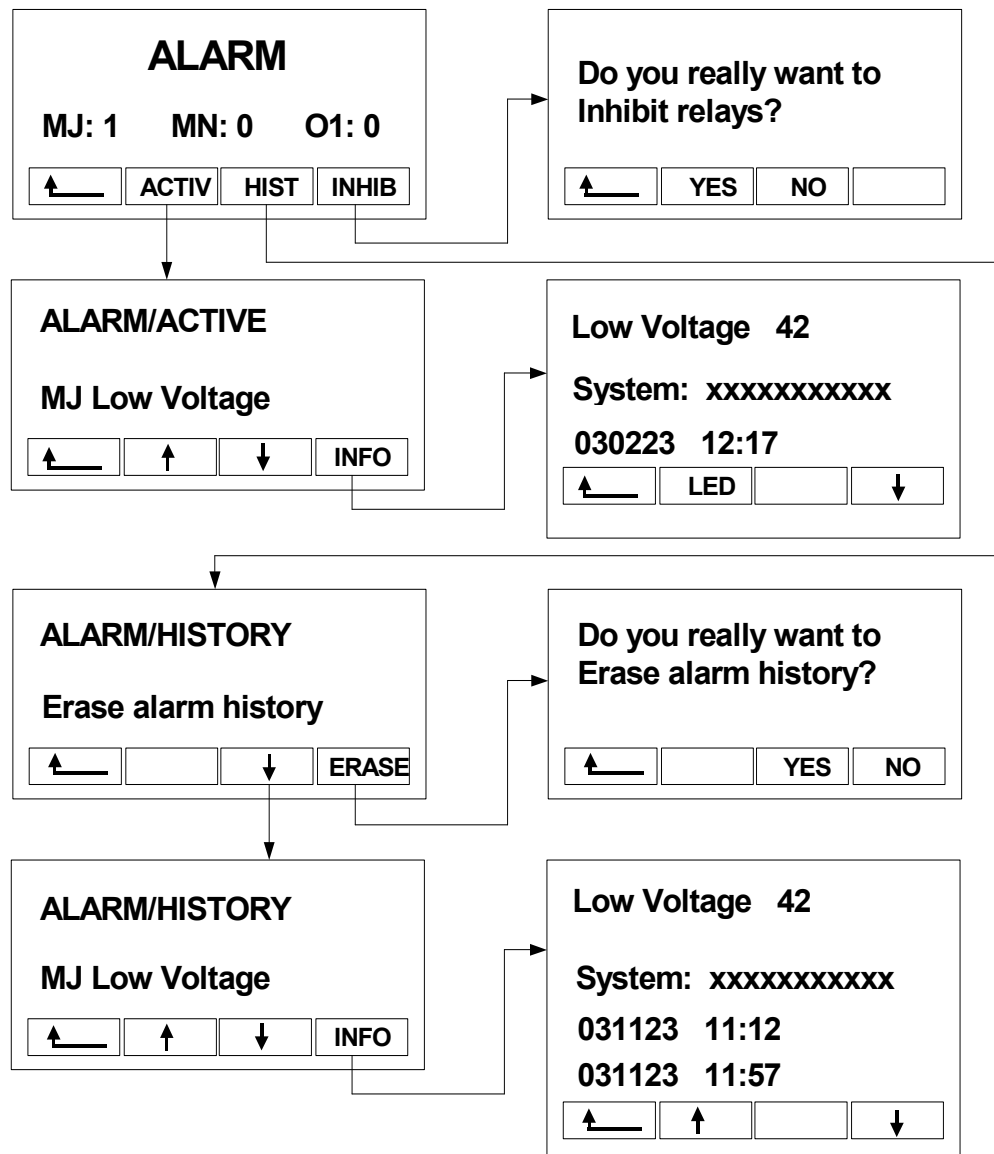
5.5.4. Modifying values

Some values can be modified locally. However, because the operator needs to enter a password before being allowed to modify certain values, these values can only be modified while accessing the GUI of the System Manager *SP* through the web interface.

5.5.5. Alarm menu

The alarm menu is used to view detailed information about ongoing (ACTIV) alarms and passed alarms (HIST). It is also possible through this menu to inhibit (INHIB) the output alarm relays and to erase the alarm log.

Figure 5.5 – Structure of the ALARM menu



5.5.5.1. Active Alarms (ACTIV)

This submenu is used to see all active alarms. The alarms are sorted in chronological order. Use the ↑ and ↓ buttons to scroll up and down the active alarm list. The menu shows information about the severity of the alarm (ex.: MJ), and the alarm name (ex.: Low Voltage). To see more information

about a specific alarm, press the INFO button when that alarm is displayed in the active alarm list.

The alarm information menu (INFO) displays more detailed information about the alarm: name of the alarm (ex.: Low Voltage), the alarm number (ex.: 42), the serial number of the unit with the alarm (ex.: xxxxxxxxxxxx), if any, and the date and time for the activation of the alarm (ex.: 030223 12:17 – YYMMDD HH:MM). Use the ↓ button to scroll within the INFO menu. Some alarms need to be reset manually. These alarms will have a CLEAR button in this menu. To clear these alarms, press the CLEAR button.

It is possible to light the LED indicator(s) of the unit that is causing the alarm by pressing the LED button. The LED indicator(s) will be lit for 30 seconds.

5.5.5.2. Alarm History

This submenu is used to view the alarm log and to erase it. Inactive alarms are sorted in chronological order of deactivation. In this submenu, the text “Erase alarm history?” is displayed. To erase the alarm log, press the ERASE button. You will be asked to confirm that you want to erase the alarm history. Erase the alarm history by pressing the YES button, or maintain the alarm history by pressing the NO button. To look at the log, press the ↑ or ↓ button to scroll through the alarm log. The log displays information about the severity of the alarm (ex.: MJ) and the name of the alarm (ex.: Low Voltage). To see more information about a specific alarm, press the INFO button when that alarm is displayed in the alarm log.

The alarm information menu (INFO) displays more detailed information about the alarm: name of the alarm (ex.: Low Voltage), the alarm number (ex.: 42), the serial number of the unit that causes the alarm (xxxxxxxxxx) if any, the date and time when the alarm was activated (ex.: 030223 11:12) and the date and time when the alarm ceased (ex.: 030223 11:57). Use the ↑ and ↓ buttons to scroll within the INFO menu.

5.5.5.3. Inhibit Output relays

This submenu is used to inhibit all output alarm relays from the controller. After pressing the INHIB button, you will be asked to confirm that you want to inhibit the output alarm relays. Inhibit these by pressing the YES button.

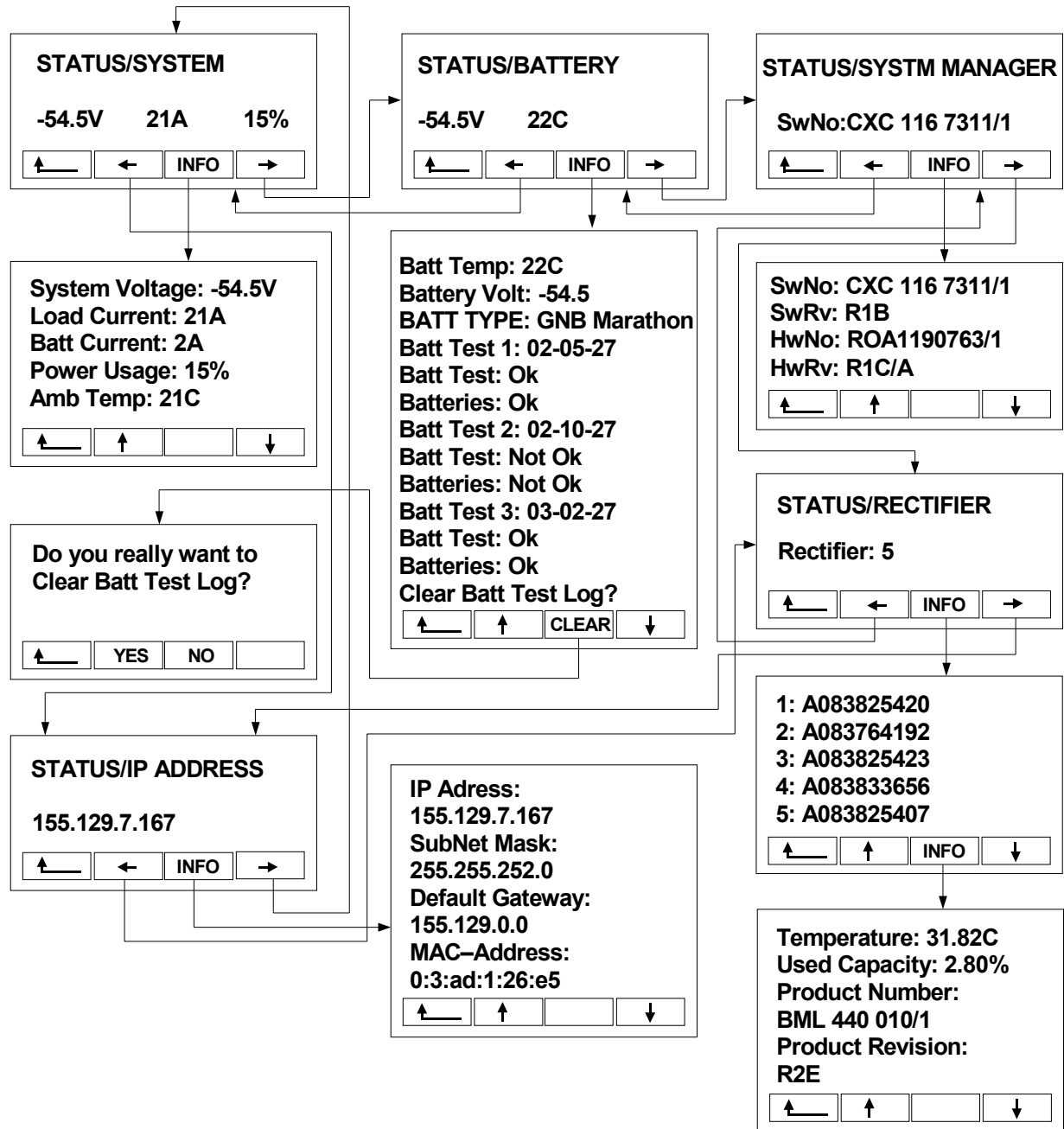
When this function is activated, the INHIB button in the alarm menu will have changed to ACTIV (not to be confused with the ACTIV button used for active alarms). To reactivate the output alarm relays, press the ACTIV button at the right of the screen. You will be asked to confirm that you want to reactivate the output alarm relays. Reactivate the output alarm relays pressing the YES button, or maintain the inhibit command by pressing the NO button.

If the inhibit command is not cancelled, the system will return to “Alarms on” after 24 hours. While the output alarm relays are inhibited, the system sends out an alarm through the O1 output relay.



5.5.6. Status menu

The status menu is used to view information about the status of the power system.



Figure 5.6 – Structure of the STATUS menu



5.5.6.1. System



This submenu provides an overview of the system status: actual system voltage (ex.: -54.5 V), load current (ex.: 21 A) and used rectifier capacity (ex.: 15%). For more information, press the INFO button and use the  and  buttons to scroll up and down the system status list.

5.5.6.2. Battery



This submenu provides an overview of the battery status: battery voltage (ex.: -54.5V) and battery temperature (ex.: 22°C). This submenu will also display the text “No sensor connected” if no battery temperature sensor is connected to the system. For more information, press the INFO button and use the  and  buttons to scroll up and down the battery status list.

When the text “Clear Batt Test Log?” is visible in the top line of the submenu, the CLEAR button is activated. To clear the battery test log, press the CLEAR button. You will be asked to confirm that you want to clear the battery test log. Clear the battery test log by pressing the YES button, or maintain the battery test log by pressing the NO button.



5.5.6.3. System Manager

This submenu is used to view the System Manager *SP* software and hardware information. For more information, press the INFO button and use the  and  buttons to scroll up and down the System Manager *SP* information.

5.5.6.4. Rectifier

This submenu is used to view rectifier information. In the STATUS/RECTIFIER submenu, the number of rectifiers recognized by the controller is displayed. For more information, press the INFO button and use the  and  buttons to scroll through the list of rectifiers and their serial numbers. When the desired rectifier is highlighted, press the INFO button again to see more information about that specific rectifier.

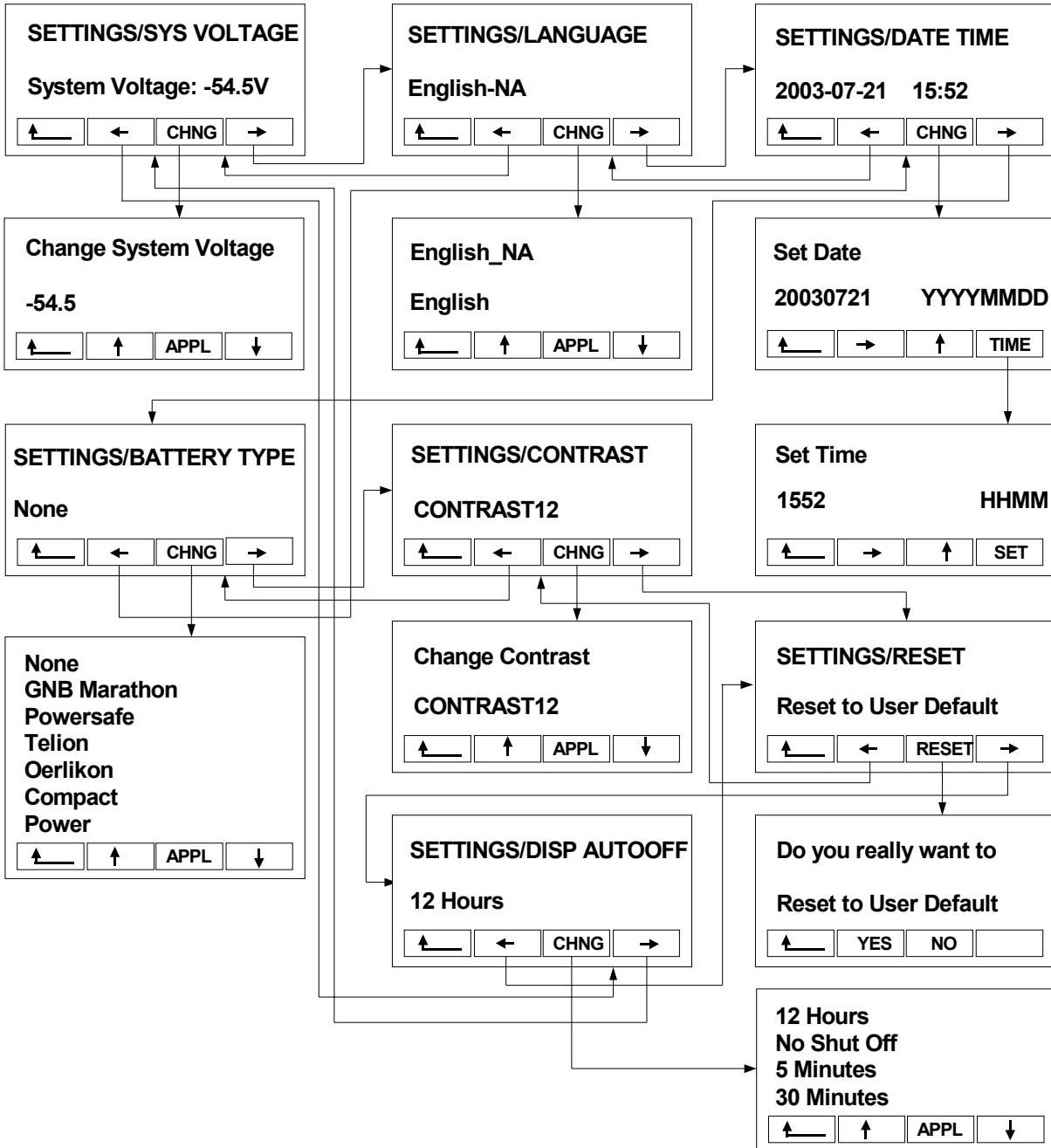
5.5.6.5. IP Address

This submenu is used to view the IP address of the System Manager *SP*. To see more information, press the INFO button and use the  and  buttons to scroll up and down the information.

5.5.7. Settings menu

The settings menu is used to change some of the parameters for the power system. Note that some values can only be modified while accessing the GUI of the controller through the web interface since the operator needs to enter a password before being allowed to modify these values.

Figure 5.7 – Structure of the SETTINGS menu



5.5.7.1. System Voltage

This submenu is used to set the nominal system voltage. The actual system voltage may differ from the nominal system voltage if one or more of the following functions is/are active: temperature compensation, a boost charge, a battery test or battery current limiting.

To change the nominal system voltage, press CHNG. In the next screen, use the **↑** and **↓** buttons to change the voltage in increments of 0.1 V. Save the new value by pressing the APPL button.

5.5.7.2. Language

This submenu is used to set the language used in the menus.

To change the language, press CHNG. In the next menu, use the **↑** and **↓** buttons to choose the desired language (English – NA [North American] or English [European]). Save the setting by pressing the APPL button.

5.5.7.3. Date Time

This submenu is used to set the system date and time.

To change the date or time, press CHNG. In the next menu (date), use the **↑** button to change the highlighted digit in increments of 1. Use the **→** button to move to the digit that is to be changed (highlighted). Press the TIME button; change the time in the same way the date was changed. To save the new setting of date and/or time, press the SET button in the Set Time screen.

5.5.7.4. Battery Type

This submenu is used to set the battery type. If the battery type used with the system is part of the batteries in the list, select this specific type.

To select or change the battery type, press CHNG. In the next screen, use the **↑** and **↓** buttons to select the applicable battery type. Save the setting by pressing the APPL button.

5.5.7.5. Contrast

This submenu is used to change the contrast of the LCD display.

To change the contrast of the LCD display, press CHNG. In the next screen, use the **↑** and **↓** to change the contrast in increments of 1. Save the setting by pressing the APPL button.

5.5.7.6. Reset

This submenu is used to restore all values in the System Manager *SP* to user default settings. All the power system specific settings will be lost except the date and time.



To restore the System Manager *SP* to user default settings, press the RESET button. You will be asked to confirm that you really want to reset to user default settings. To reset the System Manager *SP* to user default settings,

press the YES button. The System Manager *SP* will restart and revert to the user default values. Note that this will take a few minutes. To maintain the current settings, press the NO button

Plant specific settings can be saved as user default values when accessing the System Manager *SP* remotely through the web interface. If no plant specific settings have been saved as user default settings, the user default settings are equal to the factory default settings.

5.5.7.7. Display Auto Off

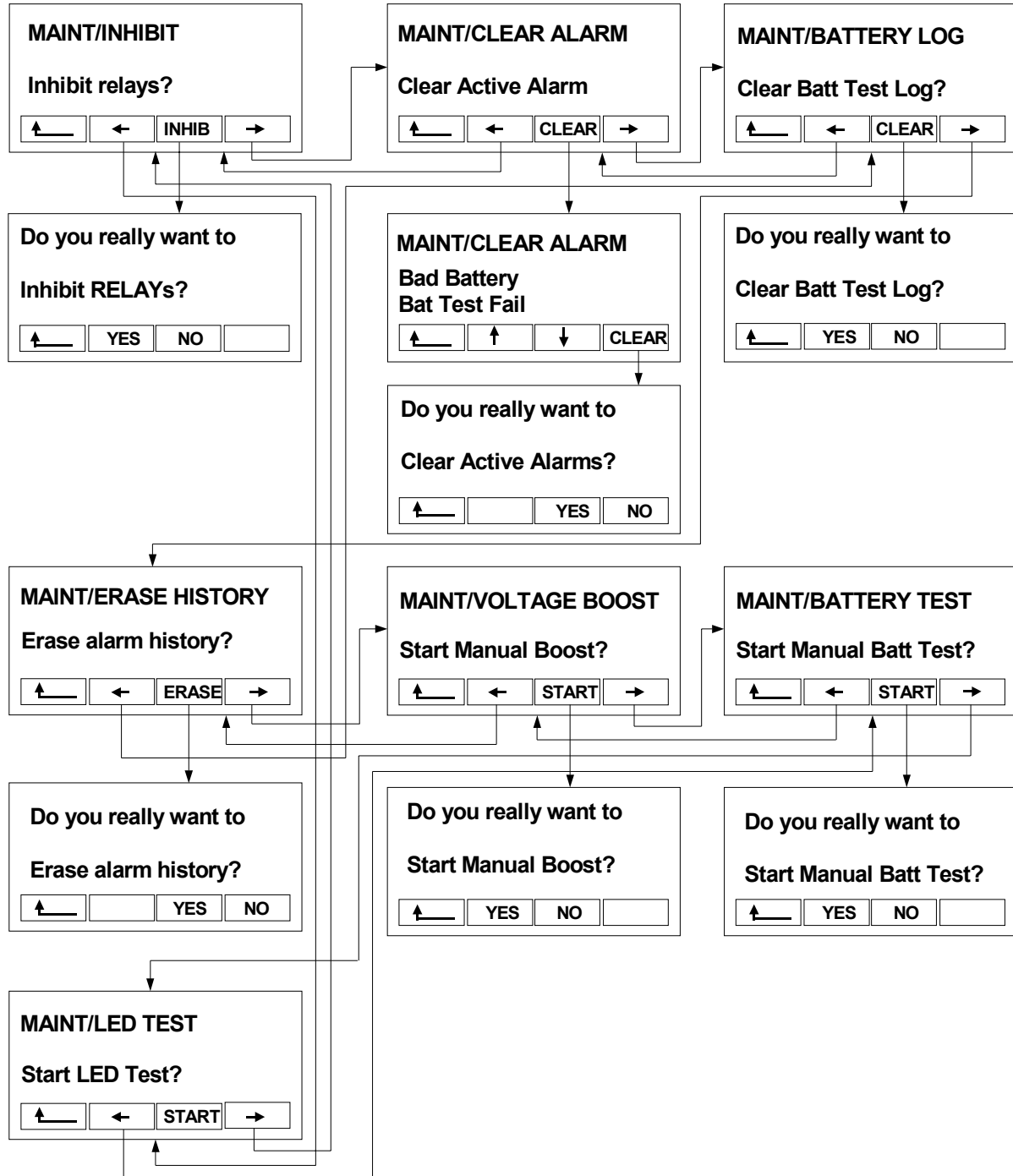
This submenu is used to set the shutoff time for the LCD graphical display of the System Manager *SP*. If no button has been pressed during this time, the controller display will shut off. The display will not shut off if there is an active alarm in the system. The display activates automatically if an alarm occurs, or if any button is pressed. The set shutoff time is shown in this submenu.

To change the shutoff time, press CHNG. In the next screen, use the  and  buttons to choose a shutoff time or no shutoff. Save the setting by pressing the APPL button.

5.5.8. Maintenance menu

This menu is used to inhibit outgoing alarms, clear logs and active alarms, start a manual voltage boost, start a manual battery test, and start a LED test.

Figure 5.8 – Structure of the MAINTENANCE menu





5.5.8.1. Inhibit Output relays

This submenu is used to inhibit all output alarm relays on the controller. After pressing the INHIB button, you will be asked to confirm that you want to inhibit the output alarm relays. Inhibit these by pressing the YES button.

When this function is activated, the INHIB button will have changed to ACTIV. To reactivate the output alarm relays, press the ACTIV button. You will be asked to confirm that you want to reactivate the output alarm relays. Reactivate the output alarm relays pressing the YES button, or maintain the inhibit command by pressing the NO button.

If the inhibit command is not cancelled, the system will return to “Alarms on” after 24 hours. While the output alarm relays are inhibited, the system sends out a service an alarm through the O1 output relay.

5.5.8.2. Clear Active Alarms

This submenu is used to clear the “Bad Battery” and “Battery Test Fail” alarms. Use the  and  buttons to select which alarm is to be cleared, then press the CLEAR button. You will be asked to confirm that you want to clear the alarm. Clear it by pressing the YES button, or maintain it by pressing the NO button.

5.5.8.3. Clear Battery Test Log

This submenu is used to clear the battery test log. To clear the log, press the CLEAR button. You will be asked to confirm that you want to clear the log. Clear it by pressing the YES button, or maintain it by pressing the NO button.

5.5.8.4. Erase Alarm History

This submenu is used to erase the alarm history (log). To erase the alarm history, press the ERASE button. You will be asked to confirm that you want to erase the alarm history. Erase the alarm history by pressing the YES button, or maintain it by pressing the NO button.

5.5.8.5. Start Manual Voltage Boost

This submenu is used to start a voltage boost. To start a voltage boost, press the START button. You will be asked to confirm that you want to start a voltage boost. Start a voltage boost by pressing the YES button. The voltage boost can not be started if a major (MJ) or minor (MN) alarm is active.

While the batteries are being voltage boosted, the START button in the Voltage Boost menu will have changed to STOP. To stop the voltage boost, press the STOP button, and the YES button in the next screen, or wait until the voltage boost is completed.

Voltage boost is used to reduce the charging time after an AC mains failure and to equalize the charge level of the batteries.

5.5.8.6. Start Manual Battery Test

This submenu is used to start a battery test. To start the test, press the START button. You will be asked to confirm that you want to start the test. Start the battery test by pressing the YES button. The battery test can not be started if an a major (MJ) or minor (MN) alarm is active alarm is active.

While the battery test is running, the START button in the Battery Test menu will have changed to STOP. To stop the test, press the STOP button, and the YES button in the next screen, or wait until the battery test is completed.

5.5.8.7. Start LED Test

This submenu is used to start a LED test. To start the test, press the START button. All LED indicators on all the units in the system will be lit for 30 seconds.

5.6. Remote access to the GUI of the System Manager SP

This section describes how to navigate through the graphical user interface (GUI) of the System Manager *SP* from a remote computer in order to view and/or configure the operating parameters of the Candeco *SP* power system.

For information on how to access the System Manager *SP* remotely, see Chapter 6, titled “Communicating with a System Manager *SP*”.

To access a menu or carry out a function in the GUI of the System Manager *SP*, use the computer mouse to place the cursor on the name of the screen to be displayed, or on the function to be carried out, then click on the left button of the mouse and follow the instructions as described in the following subsections.

Note: There is a hardware switch on the System Manager *SP*, which, when activated, prevents any remote action on the controller. The access is then read-only for all levels of password. For information on activating or deactivating this switch, refer to Chapter 6, “Communicating with the System Manager *SP*”.

5.6.1. Home screen

Once logged to the System Manager *SP*, the computer will display a screen similar to the following, referred to as the Home screen.

Screen 1

Emerson EnergyMaster™

Candeo SP

Highest Alarm Severity: No alarm Number of Active Alarms: - 0 -

Updated 2003-10-08 10:55:38

System Status:

Name: Technical Education MTL

System Voltage: - 55.03 V

Load Current: 0.00 A

Battery Current: 0.00 A

Power Usage: 0.00 %

Temperature Compensation: Active

Battery Test: Inactive

Voltage Boost: Inactive

Charge Control: Inactive

IP Address: 155.129.7.192

STATUS
System
System History
Equipment
System Inventory

ALARMS
Active
History
Inhibit

SETTINGS
System
System Manager SP

MAINTENANCE
Alarms
Battery
Others

Web Site Map

This screen displays the main menu of the GUI, on the left side, whether there are any active alarms, in the top line, and the **System** submenu for the **STATUS** main heading, which contains the following items:

- the name of the system (usually the location),
- the float voltage,
- the load current,
- the battery current,
- whether the temperature compensation function is active or not,
- whether there is an ongoing battery test, voltage boost or battery current limitation, and
- the IP address of the System Manager *SP*.

Note: Each screen in the GUI displays the main menu of the GUI, on the left side, as well as whether there are any active alarms in the top line. However, to avoid repeating this information unnecessarily, this information will not be shown in the other screens in this Chapter.

5.6.2. Menu structure of the GUI

To view the complete menu structure in the GUI, after you have logged onto the System Manager *SP*, click on **Web Site Map** at the bottom of the main menu, on the left side of the screen. The complete menu, as listed in the following table, will be displayed.

Table 5.5 – Structure of the menu in the GUI of the System Manager *SP*

Main Heading	Sub-headings	
STATUS	System	
	System History	
	Equipment	
	System Inventory	
ALARMS	Active	
	History	
	Inhibit	
SETTINGS System	System Voltage	
	Voltage alarms	
	AC Mains Failure Delay	
	Low Voltage Disconnect	
	Battery Functions <ul style="list-style-type: none"> • Battery Preset Table • Battery Test • Voltage Boost • Temperature Compensation • Charge Control • Battery Temperature 	
	Alarm severity	
	Digital Inputs	
	Output Alarm Relays	
	Ambient Temperature	
	Default Settings	
	SETTINGS System Manager <i>SP</i>	Site Name
		Language
		IP Network Settings
EEM Protocol Settings <ul style="list-style-type: none"> • General Settings • Leased Line Settings • TCP/IP Settings • PSTN Modem Settings • GSM Modem Settings 		
PPP Settings <ul style="list-style-type: none"> • General Settings • TCP/IP Settings • PSTN Modem Settings • GSM Modem Settings 		
SNMP Settings		
Time & Date		
Password		

MAINTENANCE	Alarms <ul style="list-style-type: none"> • Clear Battery Test Alarms • Inhibit Output Alarm Relays • Clear Alarm Log
	Battery <ul style="list-style-type: none"> • Battery Test Log • Clear Battery Test Log • Start Manual Battery Test • Start Manual Boost
	Others <ul style="list-style-type: none"> • Default Settings • Restart • Service Date • LED Test

5.6.3. STATUS screens

In addition to the System submenu, described previously in the Home screen section, the following submenus are accessible under the **STATUS** main heading in the Home screen.

5.6.3.1. System History

Clicking on System History under the **STATUS** main heading in the home screen will display the following screen.

Screen 2

System History:

Avarage Power (24 h):	0.00 W
Peak Power (24 h):	0.00 W
Total Delivered Energy:	0.00 kWh
<small>Total delivered energy since last reset of system</small>	
Reset Total delivered energy:	<input type="button" value="Apply"/>

This screen displays the following information:

- the average power delivered by the system during the last 24 hours,
- the peak power reached by the system during the last 24 hours, and
- the total energy delivered by the system since the last reset.

The button is used to reset the present “Total Delivered Energy”.

5.6.3.2. Equipment

Clicking on **Equipment** under the **STATUS** main heading in the home screen will display the following screen.

Screen 3

Equipment Status:				
System Manager SP:				
Battery Voltage (V)	Battery Current (A)	Battery Temperature (°C)	Ambient Temperature (°C)	
54.31	0.00	22.12	Not connected	
Rectifier Units:				
Voltage (V)	Current (A)	Temperature (°C)	Used Capacity (%)	Serial Number
54.16	0.00	27.88	0.00	A083901390
54.22	0.00	28.00	0.00	A083866001
54.07	0.00	27.69	0.00	A083865998
54.09	0.00	27.88	0.00	A083865993
54.10	0.00	27.75	0.00	A083898512
54.18	0.00	28.13	0.00	A083898532
54.29	0.00	27.37	0.00	A083825396
54.21	0.00	27.63	0.00	A083901378

This screen displays the following information:

- the battery voltage, current and temperature, as well as the ambient temperature,
- the DC output voltage and current, the operating temperature, the % of capacity used, and the serial number for each rectifier.

5.6.3.3. System Inventory

Clicking on **System Inventory** under the **STATUS** main heading in the home screen will display the following screen.

Screen 4

System Inventory Information:					
LED Test, turns on all LEDs for devices:					Apply
Equipment:	Product Number:	Product Revision:	Serial Number:	SW Revision:	Flash LED:
System Manager SP	-	-	A083939604	R1B	
Rectifier	BML 440 010/1	R2E	A083866001	R5B	Apply
Rectifier	BML 440 010/1	R2E	A083865998	R5B	Apply
Rectifier	BML 440 010/1	R2E	A083901390	R5B	Apply
Rectifier	BML 440 010/1	R2E	A083865993	R5B	Apply
Rectifier	BML 440 010/1	R2E	A083898512	R5B	Apply
Rectifier	BML 440 010/1	R2E	A083894754	R5B	Apply
Rectifier	BML 440 010/1	R2E	A083898532	R5B	Apply
Rectifier	BML 440 010/1	R2E	A083901378	R5B	Apply

This screen displays the following information:

- a list of the modules in the system, and
- the product number, product version, serial number and software version for each module,

The button above the table is used to perform a LED test at the system's level, while the buttons on the right side of the table are used to perform a LED test at the individual module level.

5.6.4. ALARMS screens

As mentioned in the Home screen section, the top line of the Home screen readily indicates if there are any active alarms by showing the number of active alarms and the highest alarm severity. If there are any active alarms, clicking on **Active** under the **ALARMS** main header in the home screen will display the following screen.

Note: Refer to sections 5.6.5.12 and 5.6.5.14 for the assignment of the alarms on the output relay contacts.

Screen 5

Highest Alarm Severity: MAJOR		Number of Active Alarms: - 2 -			
Updated 2003-10-08 13:35:27					
Active Alarms:					
Severity	Alarm Number	Name	Activated	Origin	Serial Number
MINOR	5	Module Not Responding	031008 13:21	Rectifier	A083865870
MAJOR	153	Fuse Alarm (FA)	031008 13:20	Distribution	-

This screen displays the following information:

- a list of the active alarms for the system, and
- for each alarm, the alarm number, the alarm name, the date of activation, as well as the module from which the alarm originated and its serial number

5.6.4.1. History

Clicking on **History** under the **ALARMS** main heading in the home screen will display the following screen.

Screen 6

Alarm Log:						
Severity	Alarm Number	Name	Activated	Deactivated	Origin	Serial Number
MAJOR	12	Rectifier AC Fail	031007 15:30	031007 16:26	Rectifier Group	-
MINOR	5	Module Not Responding	031007 16:25	031007 16:26	Rectifier	A083865870
MINOR	5	Module Not Responding	031007 15:27	031007 15:27	Rectifier	A083865870
MINOR	5	Module Not Responding	031007 15:24	031007 15:25	Rectifier	A083865877
MINOR	5	Module Not Responding	030926 14:37	030926 14:37	Rectifier	A083865870
MINOR	5	Module Not Responding	030910 15:22	030910 15:22	Rectifier	-
MINOR	5	Module Not Responding	030825 14:22	030825 14:23	Rectifier	-
MINOR	5	Module Not Responding	030822 08:57	030822 08:58	Rectifier	-
MAJOR	11	Main AC Fail	030822 08:52	030822 08:54	Rectifier Group	-
						Clear log

This screen displays the following information:

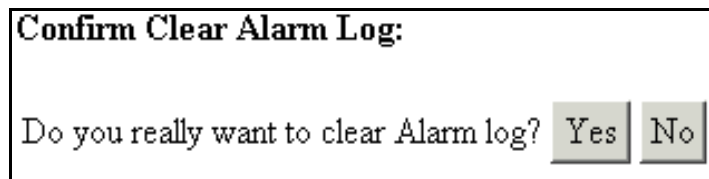
- a list of all the alarms (alarms are logged when not active any more) in the log since the last log clearing, and
- for each alarm, the severity level of the alarm, the alarm number, the alarm name, the date of activation, the date of deactivation, as well as the module from which the alarm originated and its serial number.

If there are two or more pages in the alarm log, the word **Next** will show at the bottom right hand corner of the first page. If there are three or more pages

in the alarm log, the words **Back** and **Next** will show at the bottom right hand corner of the second and second to last pages, and **Back** will show at the bottom right hand corner of the last page. Clicking on **Next** will display the next alarm log page, while Clicking on **Back** will display the previous alarm log page. The line **Show All Alarms** is also displayed on each page of the alarm log; clicking on it will display the complete alarm log on one page.

The button is present at the bottom right hand corner of each page of the alarm log. It is used to erase all entries in the alarm log for the system. Clicking on the button will display the following screen.

Screen 7

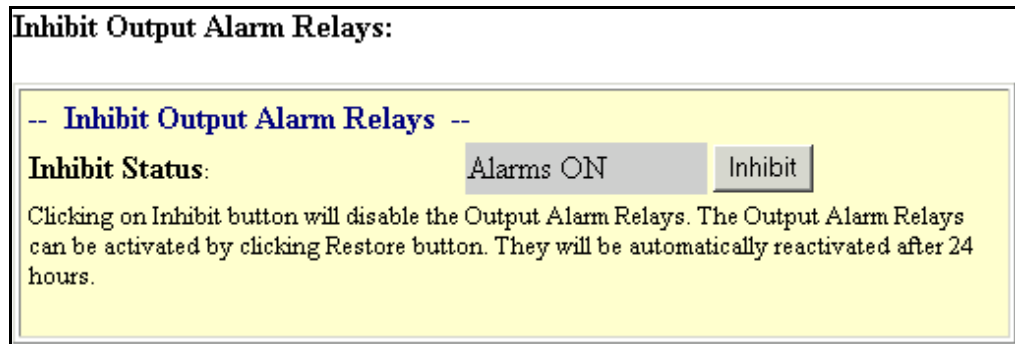


Clicking on the button confirms the erasing of the alarm log. Clicking on the button will return to the previous Home (or System) screen.

5.6.4.2. Inhibit

Clicking on **Inhibit** under the **ALARMS** main heading in the home screen will display the following screen.

Screen 8



This screen is used to inhibit the outgoing alarms for the system. This function is used typically to prevent any alarms from being transmitted externally, as well as from being displayed on the System Manager *SP*, while the system is undergoing maintenance and/or testing.

Clicking on the button, the following screen will be displayed.

Screen 9

Confirm Inhibit Outgoing Alarms:

Do you really want to inhibit outgoing alarms?

Clicking on the button will display the following screen. Clicking on the button will return to the previous screen.

Screen 10

Inhibit Output Alarm Relays:

-- **Inhibit Output Alarm Relays** --

Inhibit Status:

Clicking on Inhibit button will disable the Output Alarm Relays. The Output Alarm Relays can be activated by clicking Restore button. They will be automatically reactivated after 24 hours.

The alarms are now prevented from being transmitted externally until the button is clicked. If the button is not clicked, the alarms will be restored automatically after 24 hours.

5.6.5. SETTINGS screens

Clicking on System under the **SETTINGS** main heading in the home screen will display the following submenu screen for system settings.

Screen 11

System Settings

System Voltage

Setting the system voltage.

Voltage Alarms

Setting all parameters for voltage alarms.

AC Mains Failure Delay

Setting the delay time for the AC mains failure alarm.

Low Voltage Disconnect

Setting all parameters for low volt disconnection and reconnection.

Battery Functions

Setting all parameters for battery test and voltage boost.

Alarm Severity

Changing severity of all predefined alarms.

Digital Inputs

Setting name, activation and severity for digital input signals.

Output Alarm Relays

Associating alarms to output alarm relays.

Ambient Temperature

Sets all parameters for ambient temperature.

Default Settings

Restores all settings to default values.

5.6.5.1. System Voltage

Clicking on **System Voltage** in the submenu screen for system settings will display the following screen.

Screen 12

System Voltage:

-- System Voltage --

Present System Voltage (V): - 54.38

Nominal System Voltage (V): -54.00

From -43.00 to -56.00 V.

If one or more of the fuctions listed below are active, the present system voltage may differ from the nominal system voltage:

Temperature Compensation:	<input type="button" value="Active"/>
Battery Test:	<input type="button" value="Inactive"/>
Voltage Boost:	<input type="button" value="Inactive"/>
Charge Control:	<input type="button" value="Inactive"/>

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This screen is used to set the nominal operational voltage (float) for the system. This voltage is normally set according to the type of battery used with the system. Note that in the above screen, the **Present System Voltage** (54.38) is higher than the **Nominal System Voltage** (54.00) because the **Temperature Compensation** function is active.

If it is necessary to modify the setting (at initial start-up or when replacing the battery by another type, for example), enter the new value (between 43.00 and 56.00) in the field above the button, then click on the button to confirm the new setting.

This screen also displays the following information:

- a note to inform the user that the actual voltage may differ from the set voltage when certain functions are active, and
- a list of these functions and whether these are active or inactive.

5.6.5.2. Voltage Alarms

Clicking on **Voltage Alarms** in the submenu screen for system settings will display the following screen.

Screen 13

Voltage Alarms:

-- High Voltage --

Alarm Level (V): -56.00
From -54.00 to -56.50 V.

Alarm Hysteresis (V): 0.50
From 0.50 to 3.00 V.

-- Battery On Discharge --

Alarm Level (V): -51.00
From -40.00 to -52.00 V.

Alarm Hysteresis (V): 0.50
From 0.50 to 3.00 V.

This alarm cannot be set lower than Low Voltage Threshold.

-- Low Voltage --

Alarm Level (V): -47.00
From -40.00 to -50.00 V.

Alarm Hysteresis (V): 0.50
From 0.50 to 3.00 V.

This alarm cannot be set higher than Battery On Discharge Threshold.

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This screen is used to set the thresholds and hysteresis values for the system's High Voltage, Battery On Discharge and Low Voltage alarms. These are normally set according to the type of battery used with the system.

Note: There is no field adjustment for the HVSD thresholds. The default HVSD thresholds are 56.5 V for the rectifiers and 56.0 V for the system.

If it is necessary to modify these thresholds and hysteresis values (at initial start-up or when replacing the battery by another type, for example), enter the new values in the fields above the **Apply** buttons, then click on the applicable **Apply** button to confirm each of the new values.

When entering new values, make sure that these are within the range specified below each parameter title in the above screen, and that you observe the note at the bottom of the second and third boxes.

5.6.5.3. AC Mains Failure Delay

Clicking on **AC Mains Failure Delay** in the submenu screen for system settings will display the following screen.

Screen 14

AC Mains Failure Delay:

-- AC Mains Failure --

AC Mains Failure Delay (min): **Apply**

From 0 to 60 Min.

Time interval between AC mains failure and AC mains failure alarm.

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This screen is used to set the delay between the time an AC mains failure occurs and the time the AC mains failure alarm is reported by the system.

If such a delay is required, enter the desired delay in minutes (0 to 60), in the field above the **Apply** button, then click on the **Apply** button to confirm the new value.

5.6.5.4. Low Voltage Disconnect

Clicking on **Low Voltage Disconnect** in the submenu screen for system settings will display the following screen.

Screen 15

Low Voltage Disconnect and Reconnect:

-- General --

Disconnect Mode: Normal on Voltage, Priority on Voltage ▾

Reconnect Voltage Level (V): -50.50
From -44.00 to -52.00 V.

-- Low Voltage Disconnect --

In use:

Disconnect Level (V): -43.50
From -40.00 to -50.00 V.

Disconnect Delay (hours): 100.0
From 1 to 100 Hours.

Disconnect Delay: The maximum time between an AC mains failure alarm and Low Voltage Disconnect. If the Low Voltage Disconnect value has not been reached during this time, the contactor will open. AC Mains failure alarm can be delayed by an AC mains failure alarm delay.

-- Priority Low Voltage Disconnect --

In use:

Disconnect Level (V): -43.50
From -40.00 to -50.00 V.

Disconnect Delay (hours): 100.0
From 1 to 100 Hours.

Disconnect Delay Time: The maximum time between an AC mains failure alarm and priority Low Voltage Disconnect. If the priority Low Voltage Disconnect has not been reached during this time, the contactor will open. AC Mains failure alarm can be delayed by an AC mains failure alarm delay.

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This screen is used to enable the system's optional low voltage disconnect circuit and set its operating parameters.

Note: The Priority Low Voltage Disconnect function is not available for the time being.

If the low voltage disconnect option was provided on your system, proceed as follows:

- In the top box, select the disconnect mode in the drop-list menu; the choices are “Normal on Time, Priority On Time”, “Normal on Voltage, Priority On Voltage” or “Normal on Time, Priority On Voltage”. Factory default is “Normal on Voltage, Priority On Voltage”.
- In the top box, if it is necessary to modify the Reconnect Level threshold, enter the desired value in the field above the button, then click on the button to confirm the new value.
- In the second box, verify that the low voltage disconnect function is enabled: . If the function is disabled (), click on the button to enable the function.
- In the second box, if the “Normal on Voltage, Priority On Voltage” disconnect mode was selected above and if it is necessary to modify the Disconnect Level threshold, enter the desired value in the Disconnect Level field above the button, then click on the button to confirm the new value, or
- If the “Normal on Time, Priority On Time” or “Normal on Time, Priority On Voltage” disconnect mode was selected above and if it is necessary to modify the Disconnect Delay threshold, enter the desired time in hours in the Disconnect Delay field above the button, then click on the button to confirm the new value.

When entering new values, make sure that these are within the range specified below each parameter title in the boxes, and that you observe the note at the bottom of the second and third boxes.

Note: Do NOT enable the Priority Low Voltage Disconnect function as it is not available for the time being.

5.6.5.5. Battery Functions

Clicking on **Battery Functions** in the submenu screen for system settings will display the following submenu screen for battery functions.

Screen 16

Configuration of Battery Functions:

Battery Preset Table

Standard parameter value are stored for up to 10 battery types.

Battery Test

Test of battery condition during AC mains failure, or activated manually/cyclically by temporarily discharging the batteries.

Voltage Boost

Allows fast charging of batteries after an AC mains failure, or activated manually/cyclically by increasing system voltage during a controlled (boost) period.

Temperature Compensation

Compensation for temperature variations, decreasing system voltage at rising temperature and increasing at falling temperature.

Charge Control

Limits the charging current by decreasing the system voltage.

Battery Temperature

Sets all parameters for battery temperature alarms.

[Up one level](#)

5.6.5.6. Battery Preset Table

Clicking on **Battery Preset Table** in the submenu screen for **Battery Functions** will display the following screen.

Screen 17

Select Battery Type from Table:

Current number of battery cells: 24

Number of battery cells:

Select number of battery cells:

Battery Type:	VRLA	Energys	GNB Marathon	GNB Absolyte IP	DEKA Unigy I					
System Voltage:	2.250	2.250	2.271	2.250	2.271	-	-	-	-	-
Temperature Compensation:	-3.000	-5.000	-5.000	-5.000	-5.000	-	-	-	-	-
Voltage Boost:	2.292	2.292	2.313	2.292	2.313	-	-	-	-	-
Low Voltage Disconnect:	1.813	1.750	1.750	1.750	1.750	-	-	-	-	-
Priority Low Voltage Disconnect (Not in use):	1.750	1.750	1.750	1.750	1.750	-	-	-	-	-
Battery On Discharge:	2.125	2.125	2.125	2.125	2.125	-	-	-	-	-
Low Voltage:	1.958	1.958	1.958	1.958	1.958	-	-	-	-	-
High Voltage:	2.333	2.333	2.333	2.333	2.333	-	-	-	-	-
Choose type:	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Select Battery Type:

This screen is used to select the type of battery used with the system. By selecting the appropriate type of battery, the system will use information stored in its data base to set some of the operating system’s parameters according to this specific type of battery.

To select a battery type, click on the radio button below this specific battery type and click on the button at the bottom of the screen to confirm the battery type, then open the drop-list menu for the number of battery cells per string at the top of the screen, select the appropriate number of cells (23, 24 or 25, 24 being the default value), and click on the button below the drop-list menu to confirm the number of cells.

5.6.5.7. Battery Test

Battery Test is used to test the remaining capacity of the battery at specific intervals. The battery test function provides two modes of operation: the Manual Battery Test, used to manually start a battery test, and the Cyclic Battery Test, used to perform automatic battery tests at specific intervals.

Note: A battery test cannot be activated if there is an ongoing major or minor alarm.

Clicking on **Battery Test** in the submenu screen for **Battery Functions** will display the following screen.

Screen 18

Battery Test Configuration:

-- Battery Test Mode --

Cyclic Battery Test Mode:

-- General Battery Test Settings --

End Voltage Uend (V): -47.50
From -44.00 to -50.00 V.

Rectifier Voltage During Test(V): -47.00
From -43.00 to -50.00 V.

Test Time (min): 60
From 5 to 1200 Min.

Battery Capacity Discharge Limit (%): 30
From 30 to 50 %.

Nominal Capacity(Ah): 100
From 1 to 10000 Ah.

End voltage = (test NOT OK if this voltage is reached during test time.)
 Battery capacity limit = (test stops if discharge level is reached during test time.
 Based on the Nominal Capacity (Ah) value.)

-- Cyclic Battery Test Settings --

Number of Cyclic Tests Per Year (times): 4
From 1 to 12 Time(s).

Test Start Hour (h): 3
From 0 to 23 O'clock.

Min. Time Between Tests (days): 0
From 0 to 20 Day(s).

Forbidden Months:

January February March April
 May June July August
 September October November December

[Operate Battery Test](#)

This screen displays the following information:

- a chart at the top of the screen showing typical curves for discharge tests on good and bad batteries,
- a “Battery Test Mode” box to enable or disable the Cyclic Battery Test mode,
- a “General Battery Test Settings” box in which to enter the operating parameters for the General Battery Test function,
- a “Cyclic Battery Test Settings” box in which to enter the operating parameters for the Cyclic Battery Test function, and
- a “Clear Battery Test Alarms” box to clear the battery test alarms, if any.

Clicking on the button in the “Battery Test Mode” box will enable the Cyclic Battery Test mode. The “Cyclic Battery Test Mode” field and button text will then change from to .

Clicking on the button in the “Battery Test Mode” box will disable the Cyclic Battery Test mode.

If it is necessary to modify any settings in the “General Battery Test Settings” or “Cyclic Battery Test Settings” box, enter the new values in the applicable fields, then click on the button in the applicable box to confirm the new setting(s).

When entering new values, make sure that these are within the range specified below each parameter title in the applicable box.

Clicking on the **Operate Battery Test** line at the bottom of screen 18 will display the following screen.



Screen 19

Battery Test:	
-- Battery Test Information --	
Battery Test Status:	Inactive
Performed Test Time (hh:mm):	0:00
Remaining Test Time (hh:mm):	0:00
System Voltage:	-53.63 V
Battery Current:	0.00 A
-- Operate Manual Battery Test --	
Operate Manual Battery Test:	<input type="button" value="Start"/>
-- Operate Cyclic Battery Test --	
Stop Cyclic Battery Test:	Battery test is disabled
Cyclic Battery Test Status:	Normal
Time To Next Cyclic Battery Test: (dd:hh:mm)	Battery test is disabled
Cyclic battery test will not start if the function is disabled.	
-- Clear Battery Test Alarms --	
Bad Battery Alarm:	Not active
Battery Test Failure:	Not active
<u>Battery test parameter settings</u>	
<u>Back</u>	

This screen displays the following information:

- a “Battery Test Information” box showing whether there is an ongoing (active) battery test or not (inactive), the duration of the test so far and the remaining time if there is an ongoing battery test, the system voltage and the battery current,
- an “Operate Manual Battery Test” with a “Start” button on which to click to start a manual battery test,
- an “Operate Cyclic Battery Test” box in which an ongoing cyclic battery test can be interrupted, and showing the cyclic battery test status and the remaining time before the next cyclic battery test will be activated, and,
- a “Clear Battery Test Alarms” box to clear the battery test alarms, if any.

If a “Bad Battery Alarm” or a “Battery Test Failure” alarm is present, the

Not active field will be replaced by an **Active**  field and button. To clear an alarm, click on the  button.

Note: The “Bad Battery” and “Battery Test Failure” alarms must be reset manually; these will not reset automatically, even if the system returns to normal operation.

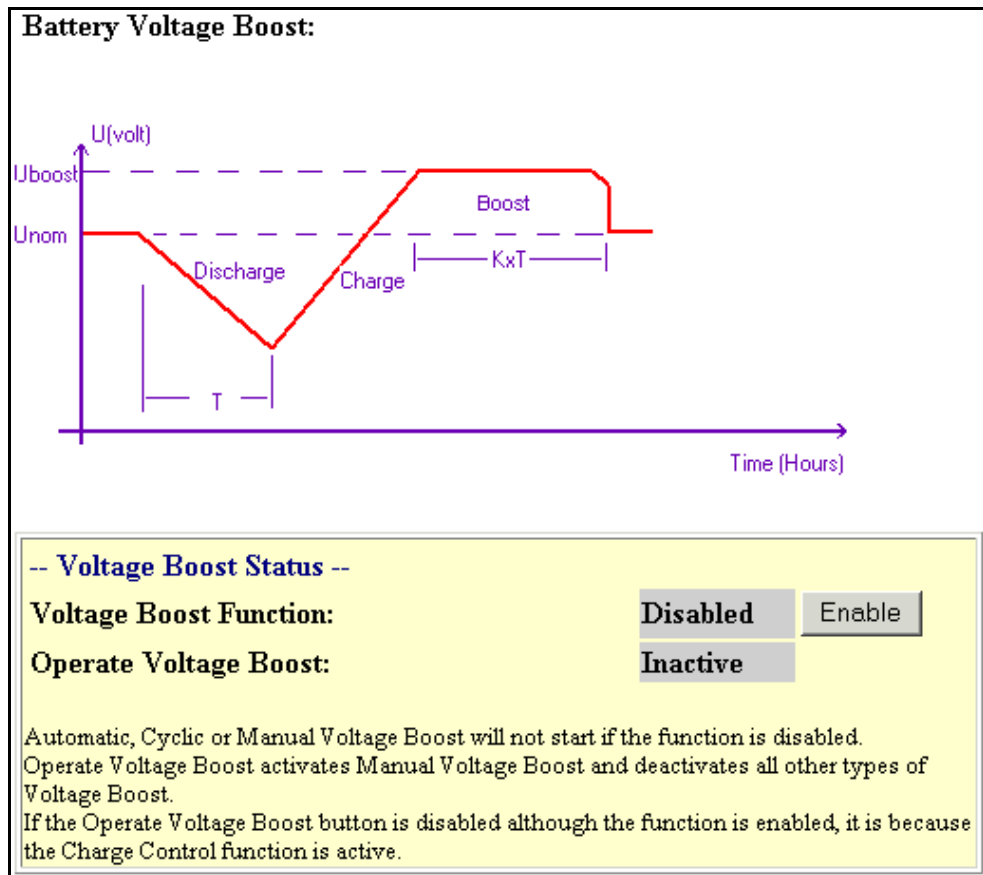
Clicking on the **Battery test parameters settings** line below the four boxes in screen 19 will return to screen 18.

5.6.5.8. Voltage Boost

Voltage boost (or equalize) is used to bring the cells of a battery back to full charge state after a low voltage condition (discharge). The voltage boost function provides three modes of operation: the Manual Voltage Boost, used to manually start a voltage boost, Automatic Voltage Boost, used to automatically perform a voltage boost, and the Cyclic Voltage Boost, used to perform a voltage boost on a cyclic basis.

Clicking on **Voltage Boost** in the submenu screen for **Battery Functions** will display the following screen.

Screen 20



-- General Voltage Boost Settings --

Voltage Boost threshold (V): -55.00
From -53.00 to -56.00 V.

Voltage level during Voltage Boost.

-- Manual Voltage Boost Settings --

Manual Voltage Boost Duration (hours): 5
From 1 to 24 Hours.

Charge time for manually initiated Voltage Boost.

-- Automatic Voltage Boost Settings --

Automatic Voltage Boost Factor (K): 8
From 1 to 16 .

-- Cyclic Voltage Boost Settings --

Cyclic Voltage Boost Interval (days): 180
From 1 to 365 Days.

Cyclic Voltage Boost Duration (hours): 5
From 1 to 24 Hours.

Minimum Time Before Next Cyclic Voltage Boost (hours): 24
From 1 to 48 Hours.

U_{nom} = Nominal voltage.
 U_{boost} = Voltage level raised to during voltage boost duration ($K \times T$).
 T = Discharge time (AC mains failure duration).
 K = Automatic charge factor.

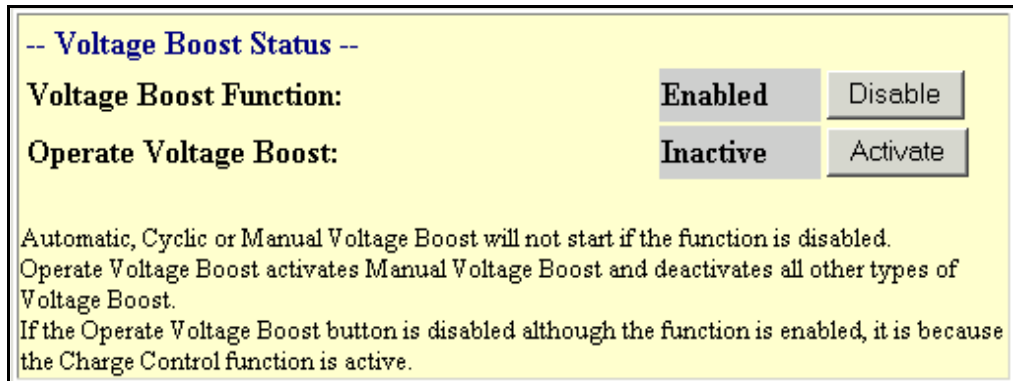
[Back](#)

This screen displays the following information:

- a chart at the top of the screen showing a typical curve for a discharge, charge and boost charge cycle,
- description of the terminology used in the chart at the bottom of the screen,
- a “Voltage Boost Status” box to activate or deactivate the voltage boost function,
- a “General Voltage Boost Settings” box in which to enter the voltage boost level,
- a “Manual Voltage Boost Settings” box in which to enter the manual voltage boost duration,
- an “Automatic Voltage Boost Settings” box in which to enter the automatic voltage boost factor, and
- a “Cyclic Voltage Boost Settings” box in which to enter the cyclic voltage boost parameters.

Clicking on the **Enable** button in the “Voltage Boost Status” box will enable the voltage boost function. The “Voltage Boost Function” field and button text will then change from **Disabled** **Enable** to **Enabled** **Disable** and an **Activate** button will be added near the “Operate Voltage Boost” field, as shown in the following screen.

Screen 21



The voltage boost function is then enabled and ready to operate in the three modes:

- An automatic boost will be started automatically as the rectifiers resume their operation after an AC mains failure. The duration of the voltage boost will be the duration of the AC mains failure times the factor value programmed in the “Automatic Voltage Boost Settings” box.
- A cyclic boost will be started automatically at every interval and for the duration programmed in the Cyclic Voltage Boost Settings” box.

- Clicking on the “Operate Voltage Boost” button will start a manual voltage boost (and stop any ongoing automatic or cyclic voltage boost).

Note: The Voltage Boost function will not be activated if the Charge Control function is active (the button will not show in the Voltage Boost Status” box).

If it is necessary to modify any settings in the “General Voltage Boost Settings”, “Manual Voltage Boost Settings”, “Automatic Voltage Boost Settings” or “Cyclic Voltage Boost Settings” box (at initial start-up or when replacing the battery by another type, for example), enter the new values in the applicable fields, then click on the button in the applicable box to confirm the new setting(s).

When entering new values, make sure that these are within the range specified below each parameter title in the applicable box.

Clicking on the button in the “Voltage Boost Status” box will disable the voltage boost function.

5.6.5.9. Temperature Compensation

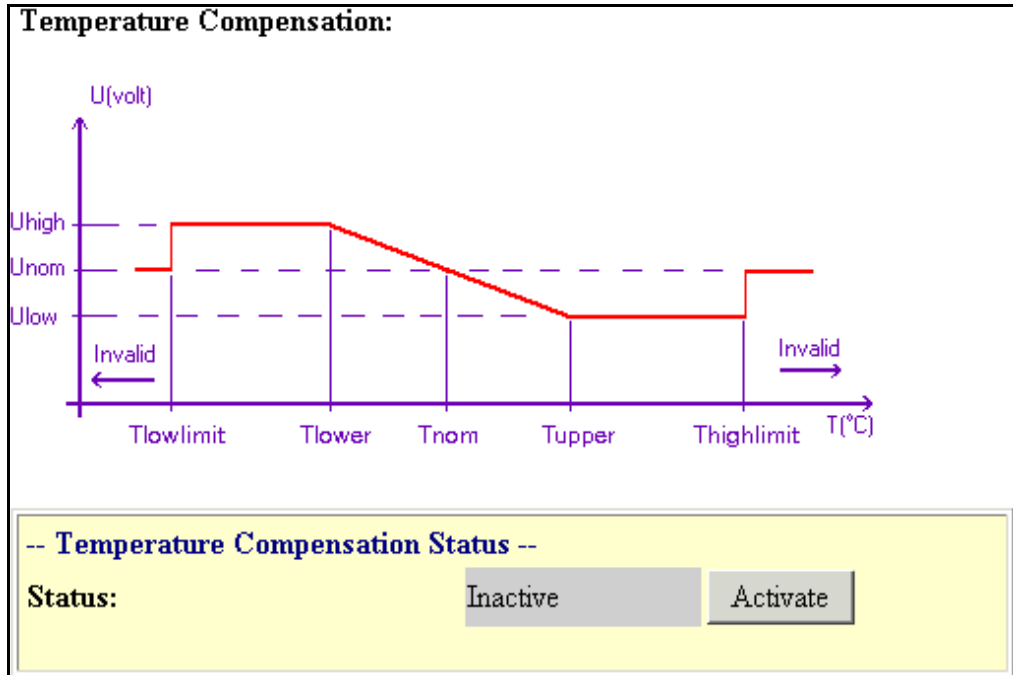
The System Manager *SP* has a temperature compensation function which automatically adjusts the float voltage of the rectifiers if the temperature of the batteries rises above or falls below a preset level. This function optimizes the life of VRLA batteries.

It is necessary to install a battery temperature probe and connect it to the Candeo *SP* power system to use this function (for information on how to do this, refer to the appropriate section in the Candeo *SP* power system Installation Manual, IM6C55A). This probe measures the temperature of the battery; when the temperature raises above or lowers below the nominal battery temperature (typically 25°C - 77°F), the temperature compensation function varies the output voltage of the rectifiers accordingly.

A second probe (optional) may also be added to measure the ambient temperature; this probe does not have any effect on the temperature compensation function, but it provide an ambient temperature alarm. However, it can also be used as a reference when trying to find the reason for a high or low battery temperature alarm.

Clicking on **Temperature Compensation** in the submenu screen for **Battery Functions** will display the following screen.

Screen 22



-- Temperature Compensation Settings --

Nominal Temperature (°C): From 20 to 25 °C.

Cell Factor (mV/Cell/°C): From 0.00 to 10.00 mV/Cell/°C

Number of Battery Cells: 11-13 cells or 23-25 cells

Nominal Temperature is the initial temperature used for calculation of temperature compensation.

Unom = Nominal voltage (value at nominal temperature).
 Uhigh = Upper voltage level where compensation ends (Unom -1.5 Volt).
 Ulow = Lower voltage level where compensation ends (Unom +1.5 Volt).

Tnom = Nominal temperature (no compensation is done at this temperature). Tupper = Upper temperature where compensation ends (42.50°C).
 Tlower = Lower temperature where compensation ends (-5.00 °C).

Tlowlimit = Low limit for valid temperature. (-45.00 °C) Below this temperature is no compensation done, Unom is used.
 Thighlimit = High limit for valid temperature (100.00 °C). Above this temperature is no compensation done, U= High limit for valid temperature

Invalid = Valid temperature range is between Tlowlimit and Thighlimit (-45.00 to 100.00 °C). Outside valid range the temperature probe is considered Invalid (no compensation is done, Unom is used).

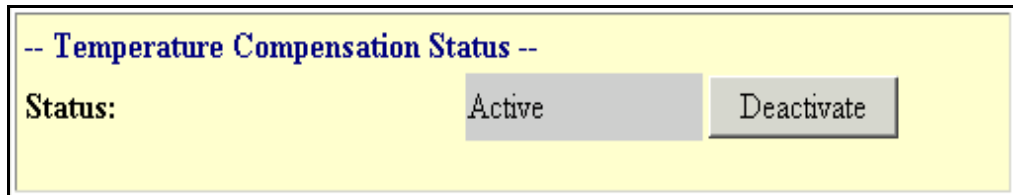
This screen displays the following information:

- a chart at the top of the screen showing a typical temperature compensation curve,

- description of the terminology used in the chart at the bottom of the screen,
- a “Temperature Compensation Status” box to activate or deactivate the temperature compensation function, and
- a “Temperature Compensation Settings” box in which to enter the temperature compensation settings.

Clicking on the button in the “Temperature Compensation Status” box will activate the temperature compensation function. The field and button text will then change from to as shown in the following screen.

Screen 23



Note 1: Activating the function does not necessarily mean “run” the function. Once the function is activated, temperature compensation will occur only when the temperature varies from the nominal value (typically 25°C - 77°F) by the value set in the “Cell Factor” field of screen 22.

Note 2: The temperature compensation function cannot be activated unless the battery temperature probe is installed and connected to the power system (refer to the appropriate section of the installation manual, IM6C55C). The optional ambient temperature probe is not required for the operation of the temperature compensation function, but it provides an ambient temperature alarm (default is 65°C).

Note 3: The “Cell Factor” and “Nominal Temperature” should be set according to the battery manufacturer’s specifications.

If it is necessary to modify the settings in the “Temperature Compensation Settings” box (at initial start-up or when replacing the battery by another type, for example), enter the new values in the “Nominal Temperature”, “Cell Factor” and “Number of Battery Cells” fields, then click on the button to confirm the new setting.

When entering new values, make sure that these are within the range specified below each parameter title in the “Temperature Compensation Settings” box.

Clicking on the **Deactivate** button will deactivate the temperature compensation function.

5.6.5.10. Charge Control

Clicking on **Charge Control** in the submenu screen for **Battery Functions** will display the following screen.

Screen 24

Charge Control:

-- Charge Control --

Charge Control Function: **Inactive** **Activate**

Charge Control (A): **300**

From 0 to 300 A.

Apply

Sets the charge control current limit.

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This screen is used to activate or deactivate the charge control function of the system and to set the applicable charge current limit. This function is used to prevent overcharging of the battery by limiting the amount of charging current that can be applied to it by the rectifiers.

If the charge control function is to be used, proceed as follows:

- Enter the maximum amount of charging current allowed to go into the battery as per battery manufacturer's recommendation, then click on the **Apply** button to confirm the value.
- Verify that the Battery Charge Control function is activated by verifying that the field and button read **Active** **Deactivate**. If the field and button read **Inactive** **Activate**, click on the **Activate** button to activate the function. The field and button will change to **Active** **Deactivate** as shown in screen 25.

Screen 25

Charge Control:

-- Charge Control --

Charge Control Function:

Charge Control (A):

From 0 to 300 A.

Sets the charge control current limit.

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Note: The Charge Control function cannot be activated unless a value is entered in the Charge Control (A) field, then applied.

Clicking on the button in screen 25 will deactivate the Charge Control function.

5.6.5.11. Battery Temperature

Clicking on **Battery Temperature** in the submenu screen for **Battery Functions** will display the following screen.

Screen 26

Battery Temperature Settings:

-- Very High Battery Temperature --

Alarm Level (°C): 55
From 45 to 85 °C.

Alarm Hysteresis (°C): 5
From 1 to 10 °C.

Very High Battery Temp. Voltage Output (V): -48.00
From -43.00 to -50.00 V.

If the battery temperature exceeds the very high battery temperature alarm level, the system voltage will be reduced to the defined voltage for this function.

-- High Battery Temperature --

Alarm Level (°C): 40
From 30 to 60 °C.

Alarm Hysteresis (°C): 5
From 1 to 10 °C.

-- Low Battery Temperature --

Alarm Level (°C): 0
From -20 to 10 °C.

Alarm Hysteresis (°C): 5
From 1 to 10 °C.

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This screen is used to set the thresholds and hysteresis values for the battery's Very High Battery Temperature, High Battery Temperature and Low Battery Temperature alarms.

Additionally, a Very High Battery Temperature Voltage Output level is set in the Very High Battery Temperature box. Should the programmed temperature Alarm Level be reached, the system then automatically reduces the output voltage of the rectifiers to the programmed voltage level in order to prevent the batteries from sustaining high temperature and high voltage conditions simultaneously.

If it is necessary to modify these thresholds, hysteresis and voltage values, enter the new values in the fields above the buttons, then click on the applicable button to confirm each of the new values.

When entering new values, make sure that these are within the range specified below each parameter title in the above screen.

5.6.5.12. Alarm Severity

Clicking on **Alarm Severity** in the submenu screen for system settings will display the following screen.

Screen 27

Change Alarm Severity:

Alarm Number	Alarm Name	Alarm Severity	Alarm LED
23	<u>Ambient Temperature Probe Fail</u>	MINOR	Yellow
84	<u>Automatic Voltage Boost in progress</u>	OBSERVATION	Yellow
72	<u>Bad Battery Alarm</u>	MINOR	Yellow
161	<u>Charge Control in progress</u>	OBSERVATION	Yellow
35	<u>Battery Shunt Fault</u>	MINOR	Yellow
34	<u>Battery Temperature Probe Fail</u>	MINOR	Yellow
66	<u>Battery Fuse Alarm</u>	MAJOR	Red
73	<u>Battery Test Fail</u>	MINOR	Yellow
1	<u>Communication Fail</u>	MINOR	Yellow
75	<u>Cyclic Battery Test in progress</u>	OBSERVATION	Yellow
83	<u>Cyclic Voltage Boost in progress</u>	OBSERVATION	Yellow
56	<u>Rectifier Fan Fail</u>	MINOR	Yellow
21	<u>High Ambient Temperature</u>	MINOR	Yellow
162	<u>High Battery Current</u>	MINOR	Yellow
32	<u>High Battery Temperature</u>	MAJOR	Red
58	<u>High Voltage ShutDown (HVSD)</u>	MAJOR	Red
22	<u>Low Ambient Temperature</u>	MINOR	Yellow
33	<u>Low Battery Temperature</u>	MINOR	Yellow
76	<u>Automatic Battery Test in progress</u>	OBSERVATION	None
11	<u>Main AC Fail</u>	MAJOR	Red
74	<u>Manual Battery Test in progress</u>	OBSERVATION	Yellow
82	<u>Manual Voltage Boost in progress</u>	OBSERVATION	Yellow
52	<u>Rectifier Fail Major (RFA major)</u>	MAJOR	Red
64	<u>Contactor Fail</u>	MINOR	Yellow
152	<u>Secondary Fuse Alarm (FA)</u>	None	None
62	<u>Low Voltage Disconnect (LVD)</u>	MAJOR	Red
2	<u>Opto Communication Fail</u>	None	None
41	<u>High Voltage (HV)</u>	MAJOR	Red
65	<u>Priority Contactor Fail</u>	MINOR	Yellow
153	<u>Fuse Alarm (FA)</u>	MAJOR	Red
63	<u>Priority Low Voltage Disconnect</u>	MAJOR	Red
55	<u>AC Input Overvoltage</u>	MAJOR	Red
51	<u>Rectifier Fail Minor (RFA minor)</u>	MINOR	Yellow
54	<u>Rectifier High Temperature</u>	MINOR	Yellow
12	<u>Rectifier AC Fail</u>	MAJOR	Red
53	<u>Rectifier Power Limit</u>	MINOR	Yellow
105	<u>Remote Shut Down</u>	MAJOR	Red
68	<u>System Manager SP Fail</u>	MAJOR	Red
67	<u>Calibration Fail</u>	MINOR	Yellow
69	<u>Configuration Fail</u>	MAJOR	Red
42	<u>Battery On Discharge (BOD)</u>	MAJOR	Red
43	<u>Low Voltage (LV)</u>	MAJOR	Red
5	<u>Module Not Responding</u>	MINOR	Yellow
31	<u>Very High Battery Temperature</u>	MAJOR	Red

This screen displays the following information for each alarm in the system:

- the alarm identification number,
- the alarm name,
- the alarm severity, and
- the color of the LED indicator associated with the alarm.

If it is necessary to modify the severity and LED color for a specific alarm, click on the name of this alarm in the above screen; a screen similar to the following will be displayed.

Screen 28

Change Alarm Severity:

-- Alarm Severity Configuration --

Alarm: 41 High Voltage (HV)

Alarm Severity: MAJOR

Alarm LED: Red

Select alarm severity by using the pull-down menu. Save your setting by clicking the Apply button or click Back to cancel.

[Back](#)

This screen is used to modify the severity and LED color of the selected alarm.

Select the desired severity (MAJOR or MINOR) in the Alarm Severity drop-list menu and the associated LED color (Red or Yellow) in the Alarm LED drop-list menu, then click on the button to confirm the new severity and LED color.

5.6.5.13. Digital Inputs

The System Manager *SP* provides eight alarm input ports, each capable of detecting the presence or absence of a battery return (0 V activation level) or battery (48 V activation level) signal. All eight ports are user programmable. Connections to these input ports are done on terminal strips, as shown in Figure 5.3.

Note: These input ports are polarized; it is therefore important to observe the positive and negative polarities.

Clicking on **Digital Inputs** in the submenu screen for system settings will display the following screen.

Screen 29

Digital Input Configuration:				
Digital Input	Alarm Name	Alarm Severity	Alarm LED	Alarm Activation
Digital Input 1	Not in use!	None	None	-48 V
Digital Input 2	Not in use!	None	None	-48 V
Digital Input 3	Not in use!	None	None	-48 V
Digital Input 4	Not in use!	None	None	-48 V
Digital Input 5	Not in use!	None	None	-48 V
Digital Input 6	Not in use!	None	None	-48 V
Digital Input 7	Not in use!	None	None	-48 V
Digital Input 8	Not in use!	None	None	-48 V

[Back](#)

This screen displays the following information for each digital input on the System Manager *SP*:

- the digital input number,
- the name of the alarm assigned to that input, or “Not in use!”, if no alarm is assigned to that input,
- the severity of the alarm assigned to that input, or “None”, if no alarm is assigned to that input,
- the color of the LED indicator associated with the alarm assigned to that input, or “None”, if no alarm is assigned to that input, and
- the alarm activation voltage level for the alarm assigned to that input
 - if “0 V” is selected, an alarm will occur when there are no signals received, or when a signal is received on only one side of the input, either the – or the + side; if both the – and + sides of the input are receiving a signal, there will be no alarm.
 - if “–48 V” is selected, an alarm will occur when both the – and + sides of the input are receiving a signal; when there are no signals received, or when a signal is received on only one side of the input, either the – or the + side, there will be no alarm.

If it is necessary to program or modify the alarm information for a specific digital input, click on the line for that specific input in the above screen; a screen similar to the following will be displayed.

Screen 30

Configure Digital Input:

-- Configure Digital Input 2 --

Alarm Name: **Not in use!**

Alarm Severity: **None**

Alarm LED: **None**

Alarm Activation: **-48 V**

[Back](#)

This screen is used to enter the alarm information for the selected digital input. To do so, proceed as follows:

- enter the alarm name in the first field,
- select the applicable severity (MAJOR or MINOR) for this alarm in the Alarm Severity drop-list menu,
- select the associated LED color (Red or Yellow) for this alarm in the Alarm LED drop-list menu,
- select the alarm activation level (0 V or –48 V) for this specific alarm, and
- click on the button to confirm the new parameters.

To deactivate an activated digital input, enter the above screen and erase the alarm name, select “None” in the alarm severity and 0 V in the Alarm Activation field, then Alarm LED fields, and click on the button.

5.6.5.14. Output relays

The System Manager *SP* provides eight user-programmable output relays, each providing “C” form contacts that can be used for alarm notification. Each output relay can be configured to report a single alarm, or up to three alarms in an OR or AND fashion. Output relays 1, 2 and 3 are factory-set and assigned respectively to Major, Minor and Observation (O1) alarms (see screen 31), but can be reconfigured and/or reassigned in the field. Connections to these ports are done on terminal strips, as shown in Figure 5.3.

The operating topology of output relay 1 (Major) is normally closed (NC); this means that the alarm contact is open (no alarm) when the relay is energized, and closed (alarm condition), when not energized. Inversely, the operating topology of output relays 2 to 8 is normally open (NO); this means that the alarm contact is closed (alarm condition) when the relay is energized, and open (no alarm), when not energized.

Clicking on **Output Alarm Relays** in the submenu screen for system settings will display the following screen.

Screen 31

Output Relay Settings:	
Output Relays	Alarm Configuration
Output Relays 1:	MAJOR
Output Relays 2:	MINOR
Output Relays 3:	OBSERVATION
Output Relays 4:	Not in use!
Output Relays 5:	Not in use!
Output Relays 6:	Not in use!
Output Relays 7:	Not in use!
Output Relays 8:	Not in use!
Back	

This screen displays the following information for output relays 1 to 8 on the System Manager *SP*:

- the output relay number, and
- the name of the alarm assigned to that input, or “Not in use!”, if no alarm is assigned to that input.

To modify the alarm name for output relays 1 to 3 or to program or modify the alarm name for output relays 4 to 8, click on the line for the applicable output relay in the above screen; a screen similar to the following will be displayed.

Screen 32

New Alarm Configuration:

-- Output Relays 1 --

Alarm Configuration:

MAJOR None

None

None

None

None

Apply

Select the alarm or alarm category to be associated with the relay output by using the pull-down menu.
 Make the desired combinations for the relay output by selecting the alarms or alarm categories with boolean operators in between them.
 The boolean expression is calculated from top to bottom. The fields that are not used shall have the value none. If there is an unused field in the middle of an expression, the values above the unused field are considered valid.
 To save the new configuration click the Apply button or choose the back link to cancel.
 If an alarm with severity none is chosen the relay output will consider the alarm as not active even if the activation criteria is fulfilled.
 To change alarm severity, choose "Alarm Severity" in the Site Settings menu.

[Back](#)

This screen is used to enable and configure the selected output relay. To do so, proceed as follows:

- select the appropriate alarm name in the drop-list menu of the first (top) field,
- if a second alarm condition is to be reported, select whether the two alarms will be reported in an AND (&) or OR (|) fashion in the drop-list menu of the second field, then select the appropriate alarm name in the drop-list menu of the third field,
- if a third alarm condition is to be reported, select whether the three alarms will be reported in an AND (&) or OR (|) fashion in the drop-list menu of the fourth field, then select the appropriate alarm name in the drop-list menu of the fifth field, and
- click on the **Apply** button to validate the new alarm configuration for the selected output relay.

To deactivate an activated output relay, enter the above screen, select the “None” text associated with this specific output relay in the drop-list menu of the five fields, then click on the **Apply** button.

5.6.5.15. Ambient Temperature

Clicking on **Ambient Temperature** in the submenu screen for system settings will display the following screen.

Note: An optional temperature probe must be installed and connected to the system for this function to be used.

Screen 33

Ambient Temperature Settings:

-- High Ambient Temperature --

Alarm Level (°C):
From 25 to 75 °C.

35

Alarm Hysteresis (°C):
From 0 to 2 °C.

2

-- Low Ambient Temperature --

Alarm Level (°C):
From -40 to 10 °C.

5

Alarm Hysteresis (°C):
From 0 to 2 °C.

2

[Back](#)

This screen is used to set the thresholds and hysteresis values for the High Ambient Temperature and Low Ambient Temperature alarm.

If it is necessary to modify these thresholds and hysteresis values, enter the new values in the fields above the buttons, then click on the applicable button to confirm each of the new values.

When entering new values, make sure that these are within the range specified below each parameter title in the above screen.

5.6.5.16. Default Settings

Clicking on **Default Settings** in the submenu screen for system settings will display the following screen.

Screen 34

Default Settings:

-- Restore to Default --

Restore:

Using this function will restore the system to default settings.
When the system is restored, the System Manager SP will restart automatically.

-- Save Default Values --

Save:

[Back](#)

This screen is used to reset the settings of the Candeco *SP* power system to their default values, or to save the present settings of the system as the new default values.

Reset

To reset the settings to their default values (factory settings or previously saved default values), click on the button in the Restore to Default box (upper box). The following screen will be displayed.

Screen 35

Confirm Restore to Default Values:

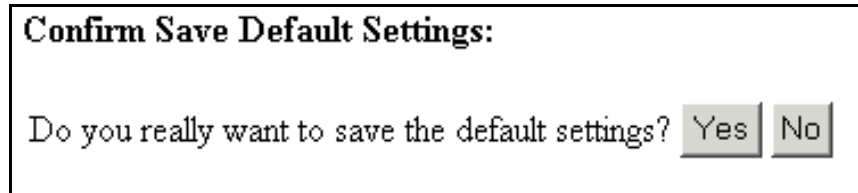
Do you really want to restore the system to default?

Clicking on the button confirms the restore to default settings for the system, while clicking on the button returns to the previous screen. If the button is clicked, the system will then prompt “Do you want to restart the System Manager *SP*, Yes or No?”; it is necessary to restart the System Manager *SP* to validate the system default.

Save

To save the present settings in the system as the new default values for the system, click on the button in the Save Default Values box (lower box). The following screen will be displayed.

Screen 36



Clicking on the button confirms the saving of the new values as the default settings for the system, while clicking on the button returns to the previous screen.

5.6.5.17. System Manager SP

Clicking on **System Manager SP** under the **SETTINGS** main heading in the home screen will display the following submenu screen for System Manager SP settings.

Screen 37

System Manager SP Settings:

Site Name

Sets the Site name.

Language

Sets the language used in the web interface.

IP Network Settings

Sets IP address, default gateway, subnet mask for communication over the Ethernet interface.

EEM Protocol Settings

Sets all parameters needed to communicate with a main EEM computer.

PPP Settings

Sets all parameters needed to communicate over the serial port with the Point to Point Protocol.

SNMP Settings

Sets Simple Network Management trap addresses.

Time & Date

Sets System Manager SP time and date.

Password

Sets user passwords.

5.6.5.18. Site name

Clicking on **Site Name** in the submenu screen for System Manager *SP* settings will display the following screen.

Screen 38

Site Name:

-- Set Site Name --

Current Site Name: Springfield Candeo SP

New Site Name:

Write the new site name in the text field. Save your setting by pressing the Apply button or press Back for cancel.

[Back](#)

This screen is used to enter the site name of the location where the Candeo *SP* power system is installed. To do so, proceed as follows:

- enter the appropriate site name in the New Site Name field, and
- click on the button to confirm the new site name.

5.6.5.19. Language

Clicking on **Language** in the submenu screen for System Manager *SP* settings will display the following screen.

Screen 39

Language:

-- Choose language --

Current Language: English_NA

Choose language among available:

Select the language to be used in the web interface by using the pull-down menu. Save your setting by pressing the Apply button or press Back for cancel.

[Back](#)

This screen is used to change the language used by the GUI of the System Manager *SP*. To change the language, proceed as follows:

- select the desired language in the drop-list menu of the Choose language among available field, and
- click on the button to confirm the new language.

Note: The available choices are “English_NA” (North American English) and “English” (European English).

5.6.5.20. IP Network Settings

Clicking on **IP Network Settings** in the submenu screen for System Manager *SP* settings will display the following screen.

Screen 40

IP Network Settings:

-- Set IP Address --

Current IP Address:

New IP Address: . . .

To make the new IP address active, the system must be restarted.

-- Set Subnet Mask --

Current Subnet Mask:

New Subnet Mask: . . .

To make the new subnet mask active, the system must be restarted.


-- Set Default Gateway --

Current Default Gateway:

New Default Gateway: . . .

To make the new default gateway active, the system must be restarted.

This screen is used to enter or modify the IP Address, the Subnet Mask and the Default Gateway for communication with the System Manager *SP* over the internet interface. For each item, a line shows the current set of numbers. To enter or modify the numbers for a specific item, proceed as follows:

- enter the new set of numbers in the four fields of the applicable box, and
- click on the  button of the applicable box to confirm the new set of numbers.
- the system will then prompt “Do you want to restart the System Manager *SP*, Yes or No?”; it is necessary to restart the System Manager *SP* to validate the new IP network settings.

5.6.5.21. EEM Protocol Settings

Note: The EEM protocol is to be used only when interconnecting with an Emerson Energy Master monitoring system.

Clicking on **EEM Protocol Settings** in the submenu screen for System Manager *SP* settings will display the following screen.

This submenu is used to set the parameters required for the System Manager *SP* to communicate with a main EEM computer.

Screen 41

<p>Main Computer Settings:</p> <p>General Settings Sets common Main Computer communication parameters.</p> <p>Leased Line Settings Sets parameters specific for Leased Line communication.</p> <p>TCP/IP Settings Sets parameters specific for TCP/IP communication.</p> <p>PSTN Modem Settings Sets parameters specific for PSTN modem communication.</p> <p>GSM Modem Settings Sets parameters specific for GSM modem communication.</p> <p>Up one level</p>

General Settings

Clicking on **General Settings** in the submenu screen for EEM Protocol Settings will display the following screen.

Screen 42

-- Communication Mode --

Report In Use:

Callback In Use:

Media Selection: **Leased Line**

-- General Main Computer Settings --

Site Name:

CCID:
Valid values: 0-255

Max Alarm Report Attempts:
Valid values: 0-255.

Max Callback Attempts:
Valid values: 0-255.

Call Elapse Time (sec):
Valid values: 0-600seconds

Security Level:
1 - Read and write access
 2 - Read access
 3 - Only alarm reporting

This screen is used to select the communication mode and to set the general main computer settings.

In the Communication Mode box, select whether the Report and/or Callback functions will be used by clicking on the appropriate button(s), and select the applicable Media among the list in the Media Selection drop-list menu (None, Leased Line, PSTN Modem, GSM Modem or TCP/IP).

Confirm the choice by clicking on the button.

Leased Line Settings

If Leased Line was selected in the Media Selection drop-list menu of the Communication Mode box in screen 42, click on **Leased Line Settings** in the submenu screen for EEM Protocol Settings. The following screen will be displayed.

Screen 43

Leased Line Settings:

-- Leased Line Settings --

Baud rate (bits/s):	19200	▼
Number of data bits:	8	▼
Number of stop bits:	1	▼
Parity:	None	▼

-LeasedLine Factory default -

Set Factory Default Settings:

Using this function will restore the system to least line factory default settings
All least line settings made will be lost

[Back](#)

This screen is used to set the leased line parameters for modem communication. Enter the applicable Baud rate, Number of data bits, Number of stop bits and parity in the associated fields, then confirm these settings by clicking on the button.

Clicking on the button will return to the leased line factory default settings.

TCP/IP Settings

If TCP/IP was selected in the Media Selection drop-list menu of the Communication Mode box in screen 42, click on **TCP/IP Settings** in the submenu screen for EEM Protocol Settings. The following screen will be displayed.

Screen 44

TCP/IP Settings

-- TCP/IP Settings --

Primary Report IP Address:	0.0.0.0	<input type="text" value="0"/> . <input type="text" value="0"/> . <input type="text" value="0"/> . <input type="text" value="0"/>
Primary Report TCP Port Number:	57843	<input type="text" value="57843"/>
Secondary Report IP Address:	0.0.0.0	<input type="text" value="0"/> . <input type="text" value="0"/> . <input type="text" value="0"/> . <input type="text" value="0"/>
Secondary Report TCP Port Number:	57843	<input type="text" value="57843"/>
Callback IP Address:	0.0.0.0	<input type="text" value="0"/> . <input type="text" value="0"/> . <input type="text" value="0"/> . <input type="text" value="0"/>
Callback TCP Port Number:	57843	<input type="text" value="57843"/>
Incoming TCP Port Number:	57843	<input type="text" value="57843"/>

-- TCP/IP Factory default --

Set Factory Default Settings:

Using this function will restore the system to TCP/IP factory default settings.
All TCP/IP settings made will be lost.

This screen is used to set the TCP/IP parameters for Ethernet communication. Enter the applicable IP address and TCP port number for the primary report location, the secondary report location and the callback, as well as the incoming port number in the associated fields, then confirm these settings by clicking on the button.

Clicking on the button will return to the TCP/IP factory default settings.

PSTN Modem Settings

If PSTN Modem was selected in the Media Selection drop-list menu of the Communication Mode box in screen 42, click on **PSTN Modem Settings** in the submenu screen for EEM Protocol Settings. The following screen will be displayed.

Screen 45

PSTN Modem Settings:

-- Telephone Settings --

Primary Report Phone Number:

Secondary Report Phone Number:

Callback Phone Number:

Number Of Rings Before Answer:

Allowed values are 0-255.

Enter the phone numbers in one line without any characters separating the number. If an international number is used the international prefix is 00, not +.
Example: 004687211000.

-- Communication Settings --

Baud rate (bits/s):

Number of data bits:

Number of stop bits:

Parity:

-- Modem Initialization Settings --

Current String:

New String:

Note! Make sure that the initialisation string DOES NOT contain any space characters. The default initialisation string is for SRT modems, 56k or lower.
To find the initialisation string for the modem used, refer to the modem users' guide.

--PSTN Modem Factory Default --

Set Factory Default Settings:

Using this function will restore the system to PSTN modem factory default settings.
All PSTN modem settings made will be lost.

[Back](#)

This screen is used to set the PSTN Modem parameters for modem communication. Enter the applicable primary report, secondary report and callback phone numbers, as well as the number of rings before answer in the associated fields of the Telephone Settings box, then confirm these settings by clicking on the button.

Enter the applicable Baud rate, Number of data bits, Number of stop bits and parity in the associated fields of the Communication Settings box, then confirm these settings by clicking on the button.

Enter the initialization string for the modem in the Modem Initialization Settings box, then confirm this string by clicking on the button.

Clicking on the button will return to the PSTN Modem factory default settings.

GSM Modem Settings

If PSTN Modem was selected in the Media Selection drop-list menu of the Communication Mode box in screen 42, click on **GSM Modem Settings** in the submenu screen for EEM Protocol Settings. The following screen will be displayed.

Screen 46

GSM Modem Settings:

-- Telephone Settings --

Primary Report Phone Number:

Secondary Report Phone Number:

Callback Phone Number:

Number Of Rings Before Answer:

Allowed values are 0-255.

SIM Card PIN Code:

Enter the phone numbers in one line without any characters separating the number. If an international number is used the international prefix is 00, not +.
Example: 004687211000.

-- Communication Settings --

Baud rate (bits/s):

Number of data bits:

Number of stop bits:

Parity:

-- Modem Initialization Settings --

Current String:

New String:

Note! Make sure that the initialisation string DOES NOT contain any space characters.
The default initialisation string is for a Wavecom VMOD2 modem.
To find the initialisation string for the modem used, refer to the modem users' guide.

-- GSM Modem Factory default --

Set Factory Default Settings:

Using this function will restore the system to GSM modem factory default settings.
All GSM modem settings made will be lost.

[Back](#)

This screen is used to set the GSM Modem parameters for modem communication. Enter the applicable primary report, secondary report and callback phone numbers, the number of rings before answer, as well as the SIM card PIN code in the associated fields of the Telephone Settings box, then confirm these settings by clicking on the button.

Enter the applicable Baud rate, Number of data bits, Number of stop bits and parity in the associated fields of the Communication Settings box, then confirm these settings by clicking on the button.

Enter the initialization string for the modem in the Modem Initialization Settings box, then confirm this string by clicking on the button.

Clicking on the button will return to the GSM Modem factory default settings.

5.6.5.22. PPP Settings

Clicking on **PPP Settings** in the submenu screen for System Manager *SP* settings will display the following screen.

This submenu is used to set the parameters required to communicate with the System Manager *SP* over the serial port using the Point to Point Protocol.

Screen 47

PPP Settings:

[General Settings](#)
Sets common PPP communication parameters.

[TCP/IP Settings](#)
Sets parameters specific for TCP/IP communication.

[PSTN Modem Settings](#)
Sets parameters specific for PSTN modem communication.

[GSM Modem Settings](#)
Sets parameters specific for GSM modem communication.

[Back](#)

General Settings

Clicking on **General Settings** in the submenu screen for PPP Settings will display the following screen.

Screen 48

General PPP Settings

-- Communication Mode --

PPP in use:

Media Selection:

Enable and Disable PPP needs a restart of the System Manager SP.

[Back](#)

This screen is used to enable the Point to Point Protocol (PPP) and to select the appropriate modem type.

To enable the PPP, in the Communication Mode box, click on the button, and select the modem type among the list in the Media Selection drop-list menu (PSTN Modem or GSM Modem). Confirm the choice by clicking on the

button.

TCP/IP Settings

Clicking on **TCP/IP Settings** in the submenu screen for PPP Settings will display the following screen.

Screen 49

PPP Interface TCP/IP Settings

-- TCP/IP Settings --

PPP Interface IP Address:	206.86.223.7	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
PPP Interface Subnet Mask:	255.255.255.0	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
PPP Interface Gateway Address:	204.156.128.1	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

-- TCP/IP Factory Default --

Set Factory Default Settings:

Using this function will restore the system to TCP/IP factory default settings.
All TCP/IP settings made will be lost.

[Back](#)

This screen is used to set the TCP/IP parameters for PPP interface. Enter the applicable PPP interface IP address, Subnet mask and Gateway address, then confirm these settings by clicking on the button in the TCP/IP Settings box.

Clicking on the button in the TCP/IP Factory Default box will return to the TCP/IP factory default settings.

PSTN Modem Settings

If PSTN Modem was selected in the Media Selection drop-list menu of the Communication Mode box in screen 48, click on **PSTN Modem Settings** in the submenu screen for PPP Settings. The following screen will be displayed.

Screen 50

PPP PSTN Modem Settings:

-- Communication Settings --

Baud rate (bits/s): 38400

-- Modem Initialisation Settings --

Current String: ATE1Q0V1&D0X4&C1&K0&R1&S0&W0+++

New String:

Note! Make sure that the initialisation string DOES NOT contain any space characters.
The default initialisation string is for SRT modems, 56k or lower.
To find the initialisation string for the modem used, refer to the modem users' guide.

-- PSTN Modem Factory Default --

Set Engineering Default Settings:

Using this function will restore the system to PSTN modem factory default settings.
All PSTN modem settings made will be lost.

This screen is used to set the PPP PSTN Modem parameters for modem communication. Enter the applicable Baud rate in the associated field of the Communication Settings box, then confirm this setting by clicking on the button.

Enter the initialization string for the modem in the Modem Initialization Settings box, then confirm this string by clicking on the button.

Clicking on the button will return to the PSTN Modem factory default settings.

GSM Modem Settings

If GSM Modem was selected in the Media Selection drop-list menu of the Communication Mode box in screen 48, click on **GSM Modem Settings** in the submenu screen for PPP Settings. The following screen will be displayed.

Screen 51

PPP GSM Modem Settings:

-- Telephone Settings --
SIM Card PIN Code:

-- Communication Settings --
Baud rate (bits/s): 9600

-- Modem Initialisation Settings --
Current String: `ATS0=1E1Q0V1&D0X4&C1&K0&R0%C1&W0`
New String:

Note! Make sure that the initialisation string DOES NOT contain any space characters.
The default initialisation string is for a Wavecom VMOD2 modem.
To find the initialisation string for the modem used, refer to the modem users guide.

-- GSM Modem Factory Default --
Set Factory Default Settings:
Using this function will restore the system to GSM modem factory default settings.
Output Alarm Relays blocked

[Back](#)

This screen is used to set the PPP GSM Modem parameters for modem communication. Enter the SIM card PIN code in the associated field of the Telephone Settings box, then confirm this setting by clicking on the **Apply** button.

Enter the applicable Baud rate in the associated field of the Communication Settings box, then confirm this setting by clicking on the **Apply** button.

Enter the initialization string for the modem in the Modem Initialization Settings box, then confirm this string by clicking on the **Apply** button.

Clicking on the **Apply** button will return to the GSM Modem factory default settings.

5.6.5.23. SNMP Settings

This submenu is used to set the trap addresses required for the Simple Network Management Protocol (SNMP) communications.

Clicking on **SNMP Settings** in the submenu screen for System Manager *SP* settings will display the following screen.

Screen 52

SNMP Settings:

-- Set Trap Address 1 --

Current Trap Address 1: 0.0.0.0

New Trap Address 1: . . .

Apply

To make the new trap address active, the System Manager SP must be restarted.

-- Set Trap Address 2 --

Current Trap Address 2: 0.0.0.0

New Trap Address 2: . . .

Apply

To make the new trap address active, the System Manager SP must be restarted.

-- Set Trap Address 3 --

Current Trap Address 3: 0.0.0.0

New Trap Address 3: [] . [] . [] . []

Apply

To make the new trap address active, the System Manager SP must be restarted.

[Back](#)

To set the trap addresses, enter the new trap address 1, 2 and 3 in their respective box and confirm the new addresses by clicking on the **Apply** button in the applicable box.

5.6.5.24. Time & Date

Clicking on **Time & Date** in the submenu screen for System Manager *SP* settings will display the following screen.

Screen 53

-- Time & Date --

Date: 2003-07-23 [] (yyyymmdd)

Time: 09:39:46 [] (hhmm)

Apply

[Back](#)

This screen is used to set the date and time for the System Manager *SP*. To set or change the date and time, proceed as follows:

- enter the date using the “yyyymmdd” format in the Date field,
- enter the time using the “hhmm” format in the Time field, and
- click on the **Apply** button to confirm the date and time.

5.6.5.25. Passwords

Clicking on **Password** in the submenu screen for System Manager *SP* settings will display the following screen.

Screen 54

Password Settings:

A display password can consist of 4 to 6 digits.

Read, write and admin passwords can consist of 4 to 16 characters.

Only characters between A-Z, a-z and 0-9 are allowed.

-- Enable Authorisation --

Disabled

Enable

-- Set Display Password --

Password:

0000

Apply

-- Set Read Password --

Password:

read

Apply

-- Set Write Password --

Password:

write

Apply

-- Set Admin Password --

Password:

admin

Apply

[Back](#)

This screen is used to enter or change the passwords for remote access to the GUI of the System Manager *SP*, and to enable these passwords. Passwords are required in screens where one wishes to modify the information and/or carry out a function.

Note: If the passwords are not enabled, as shown in the Enable Authorization box of the above screen, **no** password level is active and access to the System Manager *SP* is opened at all levels to anyone that knows the IP address. It is therefore important that once the initial installation and start-up of the power system is completed, the end user replaces the factory default or any temporary installation passwords by his own passwords and enables these, then gives these passwords to his internal personnel based on the required password level for each individual as per the followings.

There are four levels of passwords for accessing the remote GUI of the System Manager *SP*. These are listed and described in the following table. The highest password level is “Admin” and the lowest password level is “Display”. All functions available to users with a given access level are available to users with higher access levels.

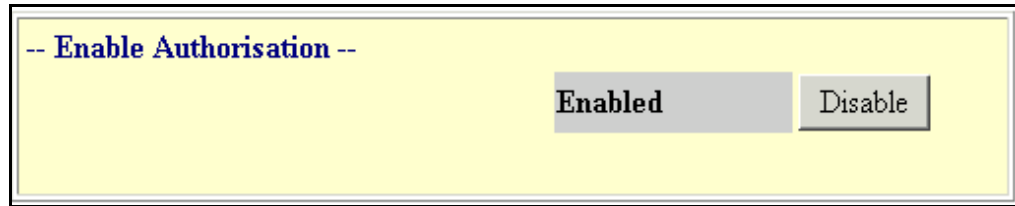
Table 5.6 – Access password levels for the GUI of the System Manager *SP*

Password level	Factory default passwords (see note)	For users with the following responsibilities:
Admin	Type admin and press <input type="text" value="Enter"/> or click on the <input type="button" value="OK"/> button	Remote users requiring to enable or disable the passwords or to modify most of the parameters in the system.
Write	Type write and press <input type="text" value="Enter"/> or click on the <input type="button" value="OK"/> button	Remote users requiring to modify some of the parameters in the system.
Read	Type read and press <input type="text" value="Enter"/> or click on the <input type="button" value="OK"/> button	Remote users for viewing of the information only.
Display	Type 0000 and press <input type="text" value="Enter"/> or click on the <input type="button" value="OK"/> button	Local users for viewing of the information only.

Note: A factory default password can be used to access System Manager *SP* remotely until one’s own password is programmed and enabled.

Enabling and disabling the passwords

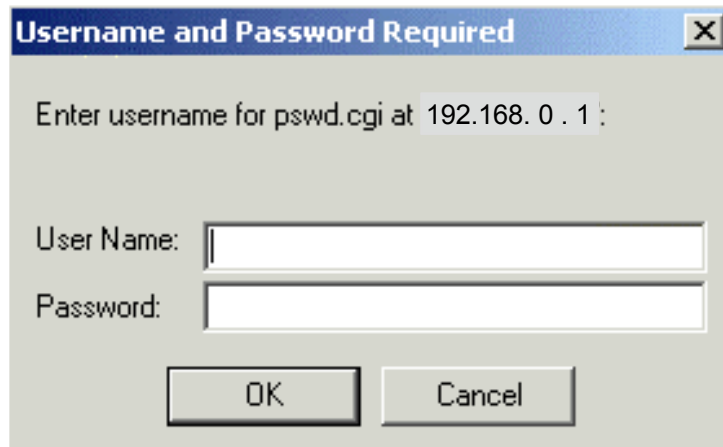
Once all passwords have been set as desired, these can be enabled by clicking on the button in the upper box in screen 54. The field and button in the box will change to as shown in the following screen.

Screen 55

Once the passwords are enabled, they can only be disabled by a user having the Admin level (see Table 5.6). To do so, click on the **Disable** button in the above screen. The **Enabled** **Disable** field and button in the box will change to **Disabled** **Enable** as shown in screen 54.

Using the passwords

When trying to modify a parameter or start a function requiring a password, a password screen similar to the following will be displayed (in this example, the “Write” level is required).

Screen 56

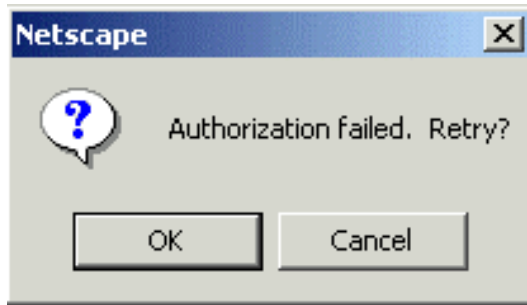
Enter the user name and password in the User Name and Password windows, then click on the **OK** button.

Note 1: The default user name is identical to the default password.

Note 2: A Display password can consist of 4 to 6 digits, while the Read, Write and Admin passwords can consist of 4 to 16 digits and/or characters (uppercase and lowercase sensitive) and can be any alphanumeric combination of the 26 letters of the alphabet, and the integers 0 to 9.

If an incorrect user name or password is entered, a screen similar to the following will be displayed.

Screen 57



Note: When clicking on a button to initiate a function or in a field to enter information, if the GUI displays immediately an ERROR page stating that access is denied, it may be that the remote hardware switch was enabled in the System Manager SP. See note at the beginning of section 5.6, and refer to Chapter 6, “Communicating with the System Manager SP” for information on activating or deactivating the hardware switch.

Setting or modifying the passwords

If the passwords are not enabled, once in screen 54, enter the new password in the applicable level box, then click on the button in that specific box to confirm the new password.

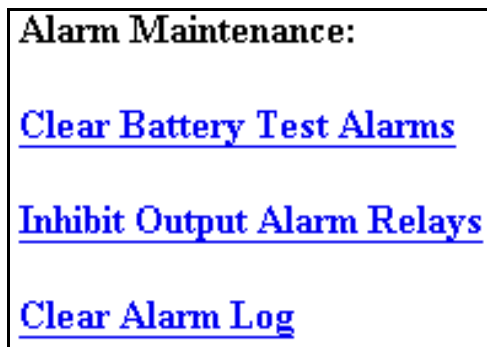
If the passwords are enabled, the Admin level is required to first disable the passwords. A new password can then be entered in the applicable level box, then confirmed by clicking on the button in that specific box.

5.6.6. Maintenance screens

5.6.6.1. Alarms

Clicking on Alarms under the MAINTENANCE main heading in the home screen will display the following submenu Alarm Maintenance screen.

Screen 58



5.6.6.2. Clear Battery Test Alarms

Clicking on **Clear Battery Test Alarms** in the **Alarms** submenu under the **MAINTENANCE** main heading will display a screen identical to the lower box of screen 19 in section 5.6.5.7. Refer to section 5.6.5.7 and screen 19 for the description of the Clear Battery Test Alarm function.

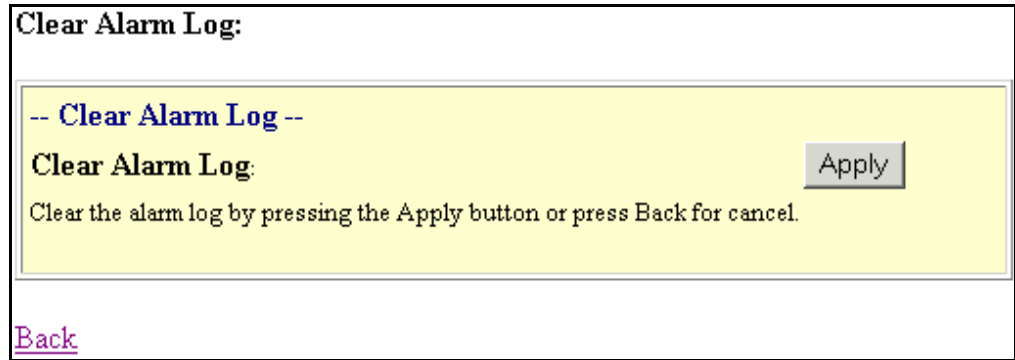
5.6.6.3. Inhibit Output Alarm Relays

Clicking on **Inhibit Output Alarm Relays** in the **Alarms** submenu under the **MAINTENANCE** main heading will display a screen identical to screen 8 in section 5.6.4.2. Refer to section 5.6.4.2 and screens 8, 9 and 10 for the description of the Inhibit Outgoing Alarms function.

5.6.6.4. Clear Alarm Log

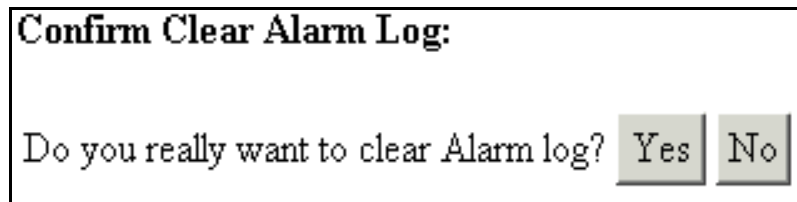
Clicking on **Clear Alarm Log** in the **Alarms** submenu under the **MAINTENANCE** main heading will display the following screen.

Screen 59



Clicking on the **Apply** button, the following screen will be displayed.

Screen 60



Clicking on the **Yes** button confirms the erasing of the alarm log. Clicking on the **No** button will return to the previous screen. Clicking on **Back** in screen 59 will return to the Alarm Maintenance screen (screen 58).

5.6.6.5. Battery

Clicking on **Battery** under the **MAINTENANCE** main heading in the home screen will display the following submenu Battery Maintenance screen.

Screen 61

Battery Maintenance:

[Battery Test Log](#)
Stores battery test data of the ten last tests.

[Clear Battery Test Log](#)

[Start Manual Battery Test](#)

[Start Manual Voltage Boost](#)

5.6.6.6. Battery Test Log

Clicking on **Battery Test Log** in the **Battery** submenu under the **MAINTENANCE** main heading will display the following screen.

Screen 62

Batterytest -4- View log					
Test start	Test type	Test duration	Test stop	Used capacity	Stop reason
030723 10:45	AC Mains Fail	00:14	030723 10:59	0.00 [Ah]	AC Mains fail ceased

Batterytest -3- View log					
Test start	Test type	Test duration	Test stop	Used capacity	Stop reason
030715 17:36	AC Mains Fail	00:00	030715 17:36	0.00 [Ah]	AC Mains fail ceased

Batterytest -2- View log					
Test start	Test type	Test duration	Test stop	Used capacity	Stop reason
030714 17:26	AC Mains Fail	00:03	030715 15:16	0.14 [Ah]	AC Mains fail ceased

Batterytest -1- View log					
Test start	Test type	Test duration	Test stop	Used capacity	Stop reason
030707 15:10	Manual	00:00	030707 15:10	0.00 [Ah]	Bad battery alarm

This screen displays the following information each of the battery tests perform by the system:

- test start date and time,
- test type,
- test duration,
- test stop date and time,
- capacity in Ah used during the test, and
- reason for stopping the test.

To view additional details about the test, click on **View log** at the right of the test number to display the following screen.

Screen 63

Site Name:	Springfield Candeo SP			
Battery test log No:	2			
Test start:	030725 14:33	Test type:	AC Mains Fail	
Test duration:	00:00	Test stop:	030804 14:32	
Used capacity:	0.00 [Ah]	Stop reason:	AC Mains fail ceased	
Time	Voltage	Current	Temperature	Discharged Capacity
(Minute)	(Volt)	(Ampere)	(°C)	(Ah)
00:00	48.37	0.00	23.26	0.00

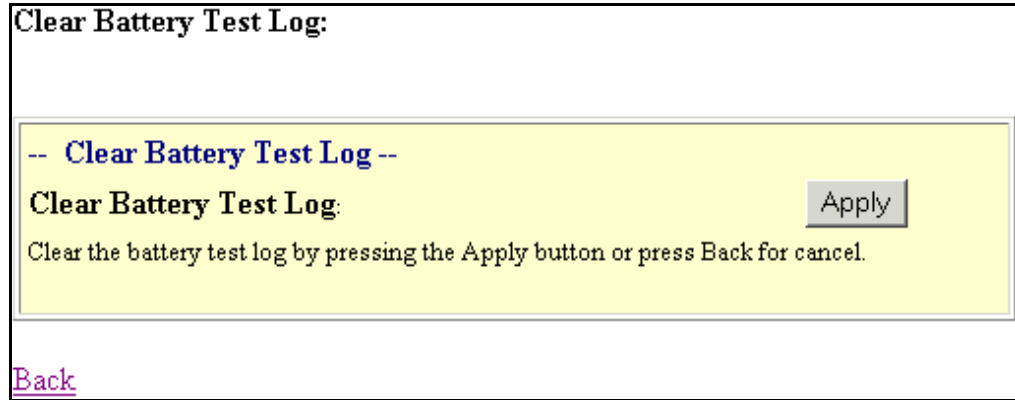
In addition to the information in screen 62, the top part of this screen displays the site name and battery test log number, while the bottom displays the following information about previous battery tests:

- the test duration (time),
- the voltage at the end of the test,
- the current at the end of the test,
- the temperature at the end of the test,
- the discharged capacity in Ah, and

5.6.6.7. Clear Battery Test Log

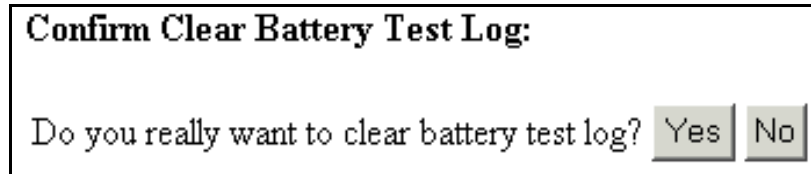
Clicking on **Clear Battery Test Log** in the **Battery** submenu under the **MAINTENANCE** main heading will display following screen.

Screen 64



This screen is used to erase all entries in the battery test log. Clicking on the **Apply** button, the following screen will be displayed.

Screen 65



Clicking on the button confirms the erasing of the battery test log.

Clicking on the button confirms returns to the previous screen.

5.6.6.8. Start Manual Battery Test

Clicking on **Start Manual Battery Test** in the **Battery** submenu under the **MAINTENANCE** main heading will display a screen identical to screen 19 in section 5.6.5.7. Refer to section 5.6.5.7 and screens 18 and 19 for the description of the Battery Test function.

5.6.6.9. Start Manual Voltage Boost

Clicking on **Start Manual Voltage Boost** in the **Battery** submenu under the **MAINTENANCE** main heading will display a screen identical to screen 20 in section 5.6.5.8. Refer to section 5.6.5.8 and screens 20 and 21 for the description of the Manual Boost function.

5.6.6.10. Others

Clicking on **Others** under the **MAINTENANCE** main heading in the home screen will display the following submenu Other Maintenance screen.

Screen 66

<p>Other Maintenance:</p> <p><u>Default Settings</u> Restores all settings to default values.</p> <p><u>Restart</u> Restart the System Manager SP.</p> <p><u>Service Date</u> Sets the service date and time.</p> <p><u>LED Test</u> LED test for connected units.</p>

5.6.6.11. Default Settings

Clicking on **Default Settings** in the **Others** submenu under the **MAINTENANCE** main heading will display a screen identical to screen 34 in section 5.6.5.16. Refer to section 5.6.5.16 and screens 34, 35 and 36 for the description of the default settings function.

5.6.6.12. Restart

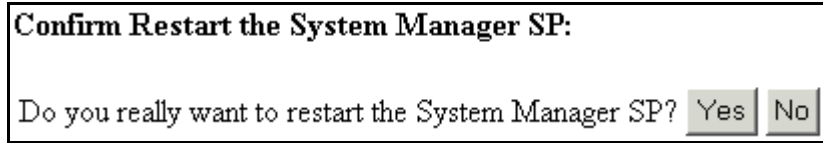
Clicking on **Restart** in the **Others** submenu under the **MAINTENANCE** main heading will display the following screen.

Screen 67

<p>Restart:</p> <p>-- Restart of System Manager SP --</p> <p>Restarting: <input type="button" value="Apply"/></p> <p>Using this function will restart the system. If the IP Address, Subnet Mask or the Default Gateway has been changed the system must be restarted. No settings made will be lost.</p> <p>Back</p>

This screen is used to Restart the System Manager *SP*. Clicking on the **Apply** button, the following screen will be displayed.

Screen 68



Confirm Restart the System Manager SP:

Do you really want to restart the System Manager SP?

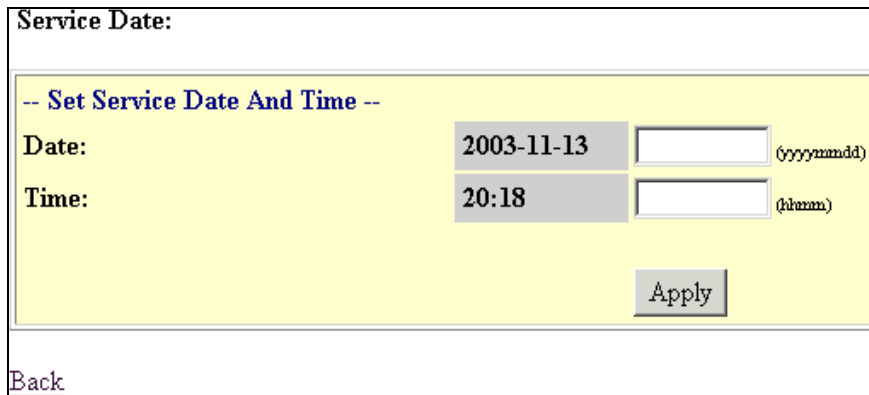
Clicking on the button confirms the restart of the System Manager *SP*.

Clicking on the button confirms returns to the previous screen.

5.6.6.13. Service date

Clicking on **Service Date** in the **Others** submenu under the **MAINTENANCE** main heading will display the following screen.

Screen 69



Service Date:

-- Set Service Date And Time --

Date: 2003-11-13 (yyyymmdd)

Time: 20:18 (hhmm)

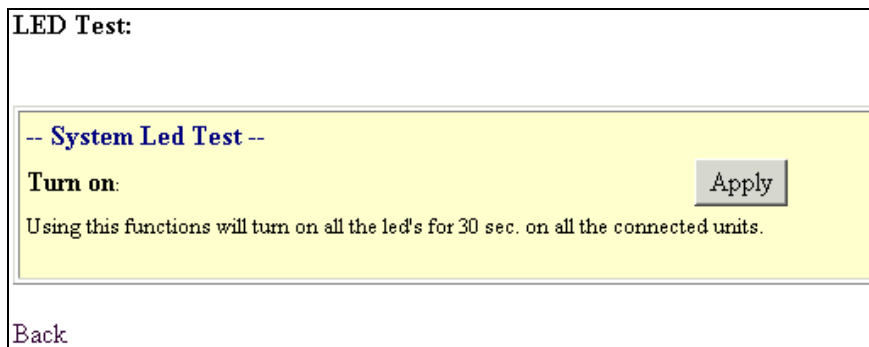
[Back](#)

This screen is used to enter the next date at which time it will be required to perform preventive maintenance routines on the Candeo *SP* power system. Clicking on the **Apply** button confirms the date.

5.6.6.14. LED Test

Clicking on **LED Test** in the **Others** submenu under the **MAINTENANCE** main heading will display the following screen.

Screen 70



LED Test:

-- System Led Test --

Turn on:

Using this functions will turn on all the led's for 30 sec. on all the connected units.

[Back](#)

This screen is used to perform a LED test on the Candeco *SP* power system. Clicking on the **Apply** button will turn all the LEDs on all connected modules in the system for 30 seconds.

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6. Communicating with the System Manager *SP*

6.1. General

The GUI of the System Manager *SP* can be accessed remotely in three ways:

- using a computer equipped with a web browser and connected locally into the RJ45 Ethernet port through a cross-over Ethernet cable,
- using a computer equipped with a web browser and connected remotely through a LAN or WAN network connection into the RJ45 Ethernet port.
- using a computer equipped with a web browser and connected remotely through a dial-up network connection into the RS-232 port via an external modem,

Note: If you do not have experience with computer communication, before attempting to carry out the instructions contained in this Chapter, contact your information system or network expert to make sure your PC is connected to the System Manager *SP* with the proper cables and that the communication parameters have been properly configured.

6.2. Recommended PC requirements

Your PC must meet the following minimum requirements to allow you to remotely connect to the System Manager *SP*.

- Hardware:
 - Processor – Pentium 120 MHz or higher,
 - 32 MB of RAM or better,
 - Network card, and
 - Network cable with switched connector.
- Software:
 - Operating system - Windows 95 or later, and
 - Netscape Navigator 4.0 or later, or
 - Internet Explorer 4.0 version 4.72 or later.

6.3. Connecting a computer to the System Manager SP

Connect the remote computer to the System Manager SP as described in the following subsections (refer to Figure 6.1 and Figure 6.2).

Figure 6.1 – Typical remote connections to the System Manager SP

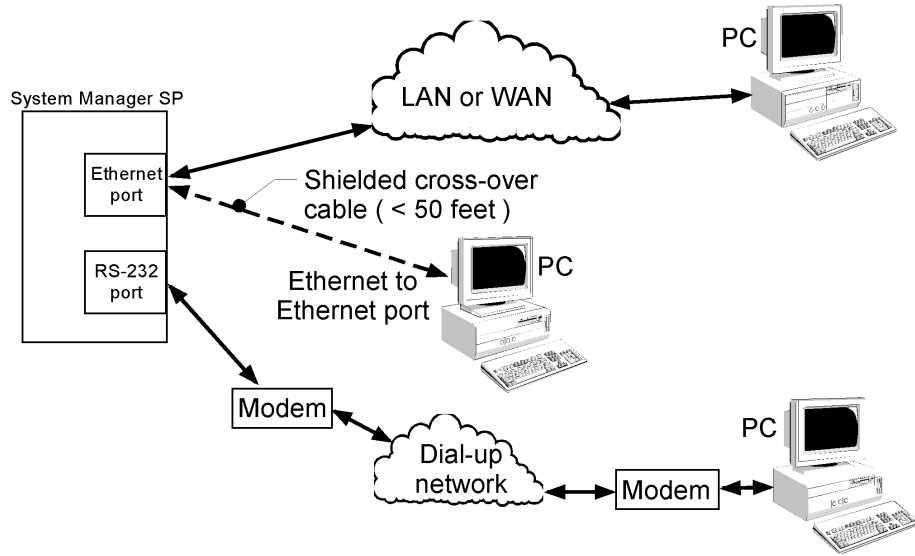
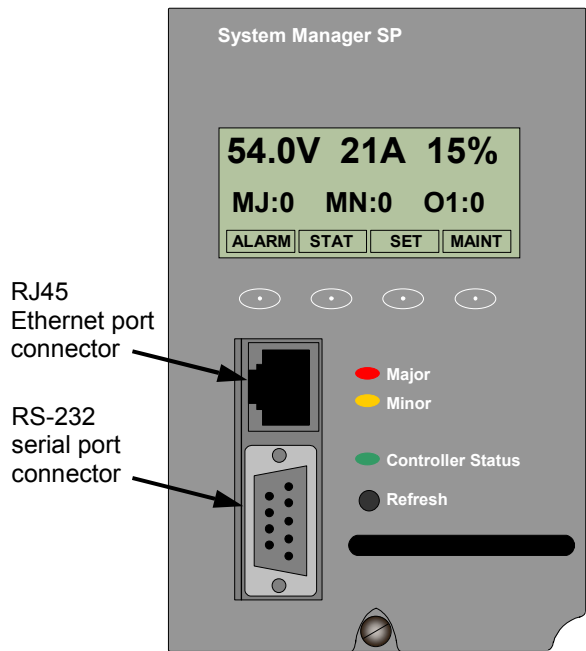


Figure 6.2 – Location of the communication ports on the front panel of the System Manager SP



Note: The connectors are accessible by lifting the flap in the front panel plastic membrane.

6.3.1. Direct Ethernet connection

Connect a local PC directly into the RJ45 Ethernet port of the System Manager *SP* as follows:

- Verify first that your computer is equipped with a network card.
- Connect the computer to the System Manager *SP* with a crossover network cable; connect one end of the cable to the network card on the computer, and the other end to the RJ45 Ethernet port on the front panel of the System Manager *SP*.

Note: Direct PC connection into the RS-232 serial port is not possible. To use the RS-232 serial port, a dial-up line must be used as described below.

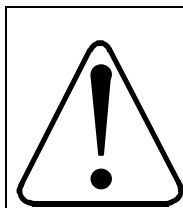
6.3.2. Remote Ethernet connection

To access the RJ45 Ethernet port of the System Manager *SP* from a remotely located PC, proceed as follows:

- Verify first that your computer is equipped with a network card and that it is connected to a LAN or WAN network with an Ethernet cable.
- Ensure that the RJ45 Ethernet port of the System Manager *SP* is also connected to a LAN or WAN network with an Ethernet cable.
- Check that your services, protocols and adapters are correctly installed and configured. If you are not sure how your computer is to be installed and configured, contact your network administrator for advice. The network connection to be used is an ordinary TCP/IP connection.
- When accessing the System Manager *SP* through a firewall, it is required to enable the following TCP/IP ports: 80 for the Web browser, 5555 for the remote GUI, and 2121 for software upgrade.

Note: If Explorer is used for the remote network connection, it is required to configure the Internet option to “Update every page as loaded” instead of “Automatic” in Settings, and to frequently do a right click and a Refresh in order to update the displayed page. This is not required if Netscape is used.

6.3.3. Remote dial-up connection



CAUTION

Protection the equipment against damages

Before connecting a modem cable into the RS-232 connector of the System Manager *SP*, ensure that the frame ground and/or BRR cable for the system is/are connected.

To access the RS-232 serial port of the System Manager *SP* from a remotely located PC, proceed as follows:

- Verify first that your computer is equipped with a modem that is connected to a regular dial-up line.


- Ensure that an external modem (optional) is connected to the RS-232 serial port of the System Manager SP and to a regular dial-up line.
- Check that your services, protocols and adapters are correctly installed and configured.

6.4. Communicating with the System Manager SP

6.4.1. Hardware switch

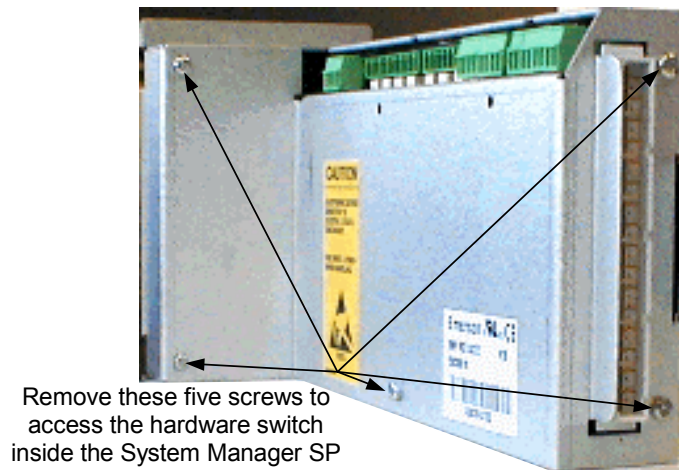
The System Manager SP is provided with a physical hardware switch, which, when enabled, prevents any action to be performed while accessing the unit remotely. Read-only is then allowed. An error screen will be displayed when clicking on a function button or in a field where to enter information.

The System Manager SP should be shipped from the factory with this switch disabled. However, if for any reason this switch was enabled, proceed as follows to disable it:

	<p>CAUTION! Prevent damages caused by electrostatic discharges (ESD).</p> <p>This equipment includes solid state devices sensitive to electrostatic discharges (ESD). It is therefore required to wear an anti-static bracelet when opening the System Manager SP to relocate the hardware switch jumper.</p>
--	---

- Remove the System Manager SP from the Candeo SP power system as described in steps 2 to 4 of Procedure 7.2 in the “Maintenance” Chapter.
- Remove the 5 screws securing the internal metal cover of the System Manager SP as shown in the following illustration.

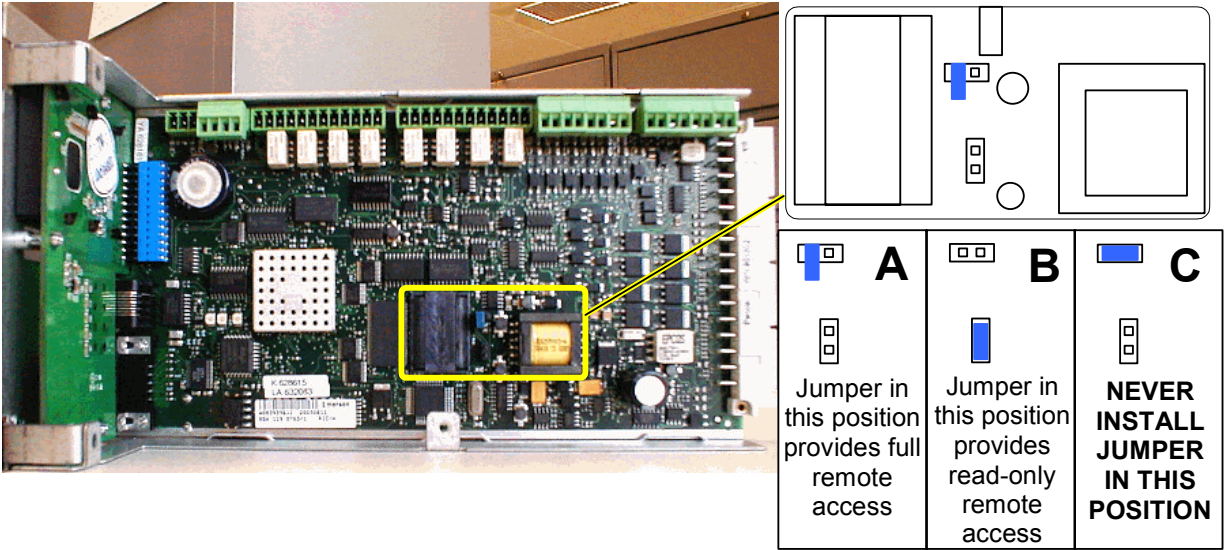
Figure 6.3 – Accessing the System Manager SP hardware switch



- Remove the metal cover from the System Manager SP.
- Verify that the small blue jumper is on the lower (vertical) dual-pin connector as illustrated by the B configuration in the following illustration.
- Remove the small blue jumper from the lower (vertical) dual-pin connector and reinstall it with one side on the left pin of the upper (horizontal) dual-pin connector and the other side hanging loose as illustrated by the A configuration in the following illustration.

Note: Never install the small blue jumper to short both pins of the upper (horizontal) dual-pin connector as illustrated by the C configuration in the following illustration. This position is for factory testing only.

Figure 6.4 – Setting the System Manager SP hardware switch



6.4.2. Ethernet communication

If you use an Ethernet connection, you will have to enter the IP address, Subnet Mask and Default Gateway of the System Manager SP.

At initial installation, the factory defaults should be:

- IP address – **192.168.0.1**
 - Subnet Mask – **255.255.255.0**
 - Default Gateway – **192.168.0.0**
- | |
|--|
| |
| |
| |

Note: Once the installation is completed, it is suggested that the end user replaces the default IP address, Subnet Mask and Default Gateway by his own and that he enters these in the above box.

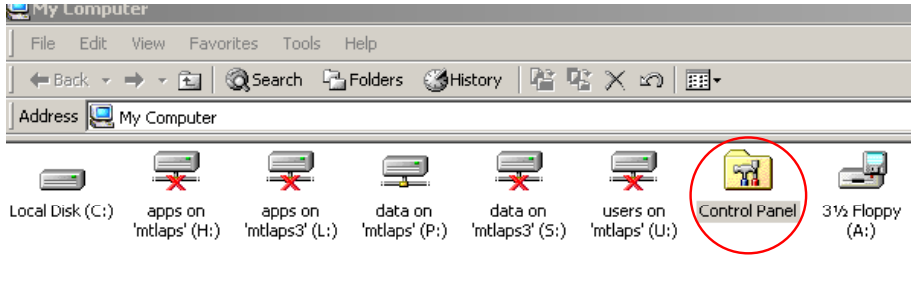
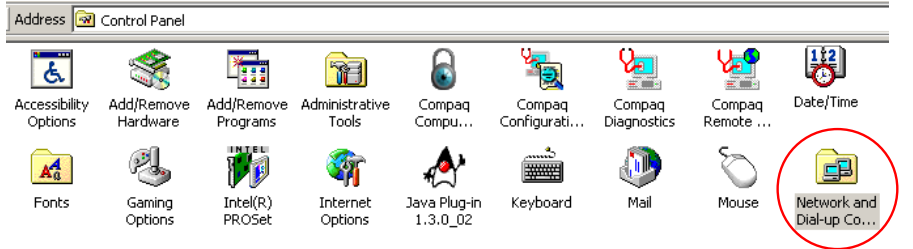
- If the IP address, Subnet Mask and Default Gateway have been changed and are unknown, proceed as follows:
- If you are trying to logon directly to a System Manager SP, the IP address, Subnet Mask and Default Gateway numbers are displayed in the IP address screen of the STATUS menu (see to Figure 5.6 in the previous Chapter), which can only be accessed on the System Manager SP, not remotely. To display this screen, in the Home screen of the LCD display on the System Manager SP, click on the **STAT** button. In the STATUS/ SYSTEM screen, press on the **←** button. In the STATUS/IP ADDRESS screen, press on the **INFO** button. The IP address, Subnet Mask and Default Gateway screen will be displayed.
- If you are trying to logon remotely, contact your network administrator to obtain the latest IP address, Subnet Mask and Default Gateway.

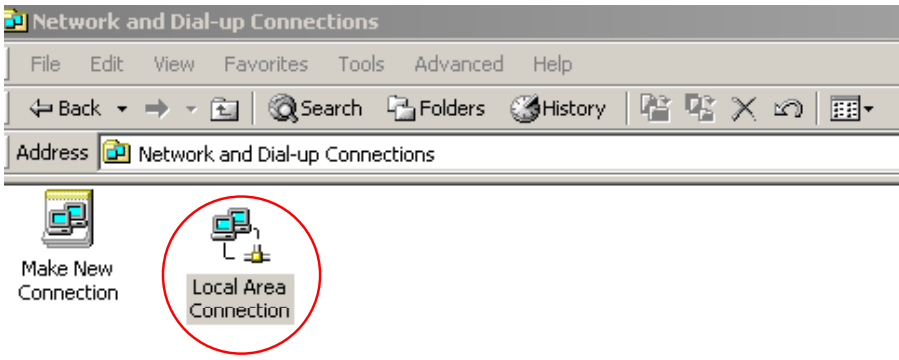
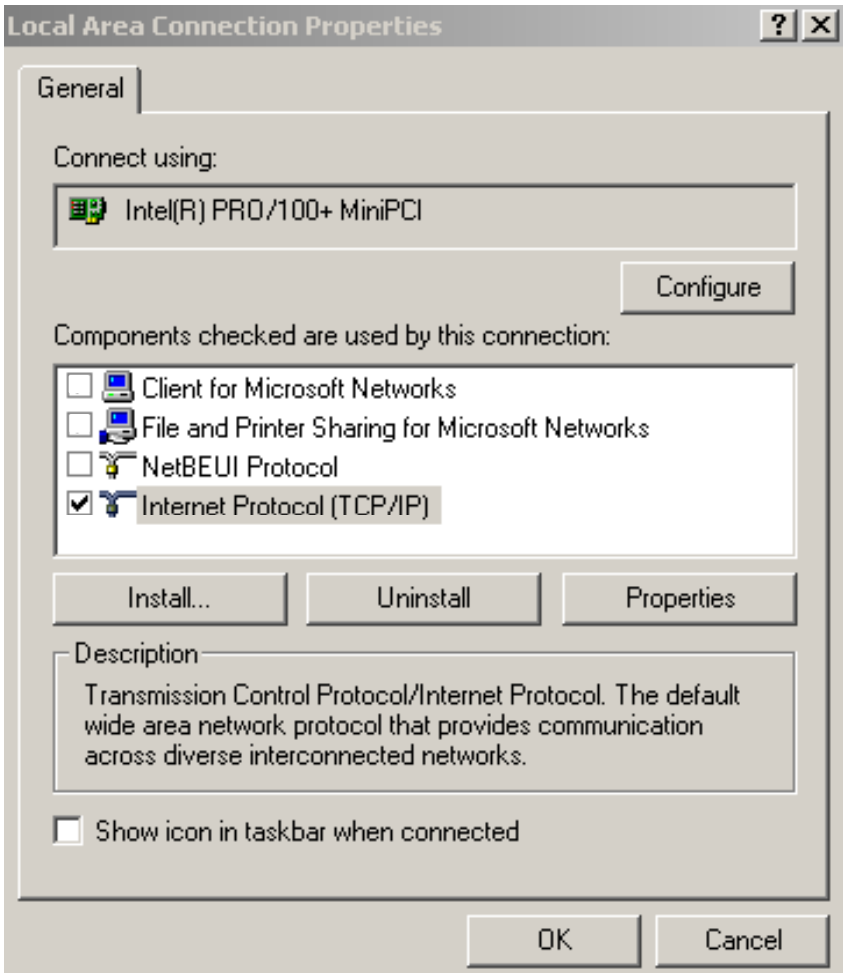
6.4.2.1. Making the connection

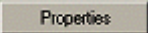
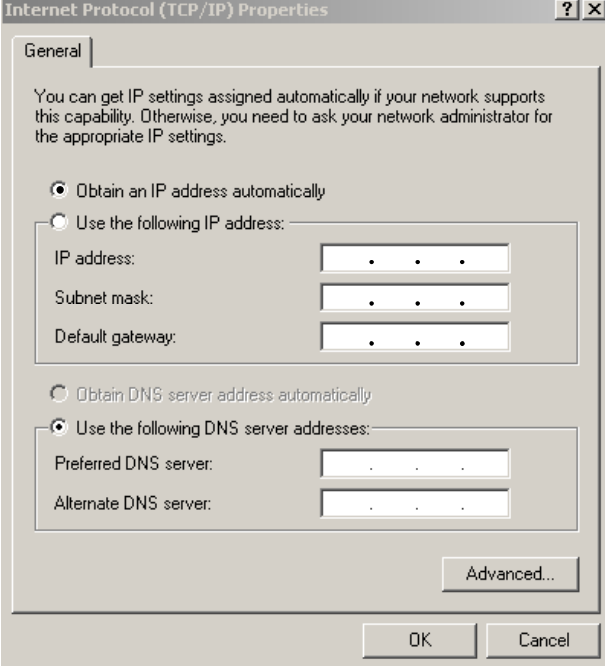
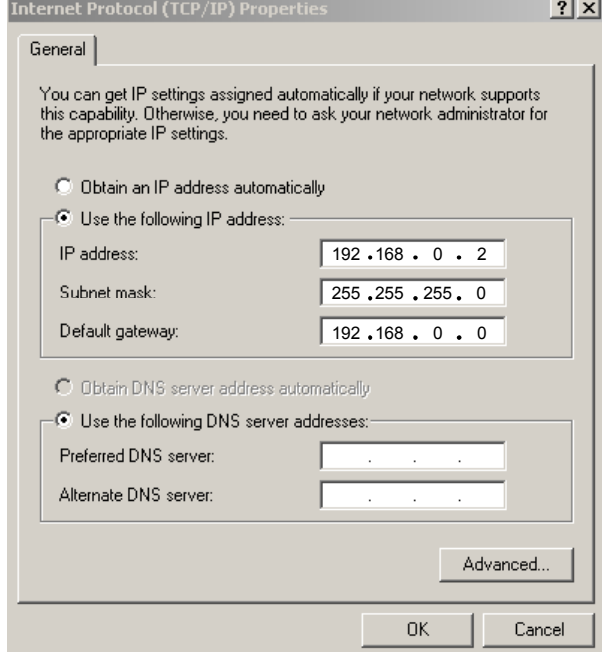
To make the final connection to the System Manager SP, proceed as described in Procedure 6.1 if your computer is equipped with Windows 2000, or Procedure 6.2 if your computer is equipped with Windows 98 or 95.

Note: Ensure that the web browser has a direct connection to Internet and that no proxy server is used.

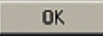
Procedure 6.1 – Establishing an Ethernet connection with Windows 2000

Step	Action
1	<p>In the screen of your PC double-click on the My Computer icon. A screen containing various icons, similar to the following, will be displayed.</p> 
2	<p>Double-click on the Control Panel icon. A screen containing various icons, similar to the following will be displayed.</p> 
<p>–continued–</p>	

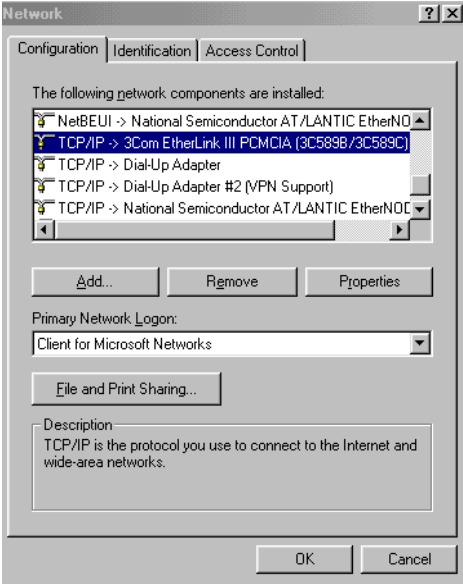
Step	Action
3	<p>Double-click on the Network and Dial-up Connections icon. A screen containing the following icons will be displayed.</p>  <p>The screenshot shows the 'Network and Dial-up Connections' window with a menu bar (File, Edit, View, Favorites, Tools, Advanced, Help) and a toolbar (Back, Forward, Search, Folders, History, etc.). The address bar shows 'Network and Dial-up Connections'. Below the address bar, there are two icons: 'Make New Connection' and 'Local Area Connection'. The 'Local Area Connection' icon is circled in red.</p>
4	<p>Right-click on the Local Area Connection icon, then select "Properties". A screen similar to the following will be displayed.</p>  <p>The screenshot shows the 'Local Area Connection Properties' dialog box. The 'General' tab is selected. Under 'Connect using:', 'Intel(R) PRO/100+ MiniPCI' is listed with a 'Configure' button. Below, 'Components checked are used by this connection:' lists several items with checkboxes: 'Client for Microsoft Networks', 'File and Printer Sharing for Microsoft Networks', 'NetBEUI Protocol', and 'Internet Protocol (TCP/IP)' (which is checked). At the bottom, there are 'Install...', 'Uninstall', and 'Properties' buttons. A 'Description' box contains text about Transmission Control Protocol/Internet Protocol. At the very bottom, there are 'OK' and 'Cancel' buttons.</p>
<p>–continued–</p>	

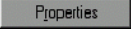
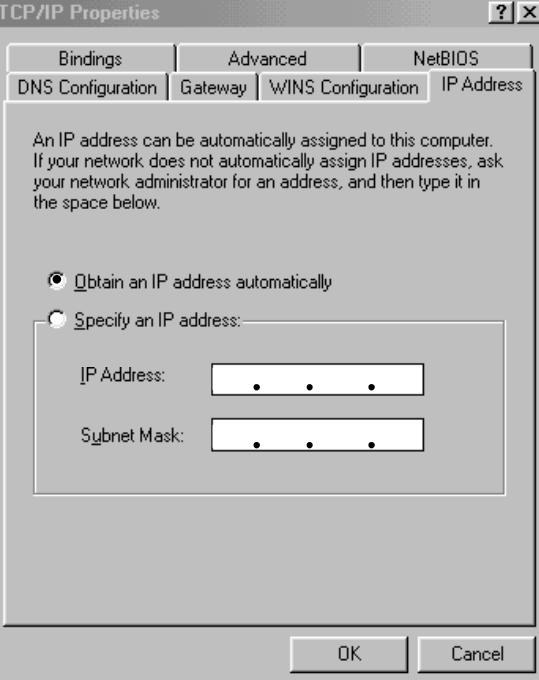
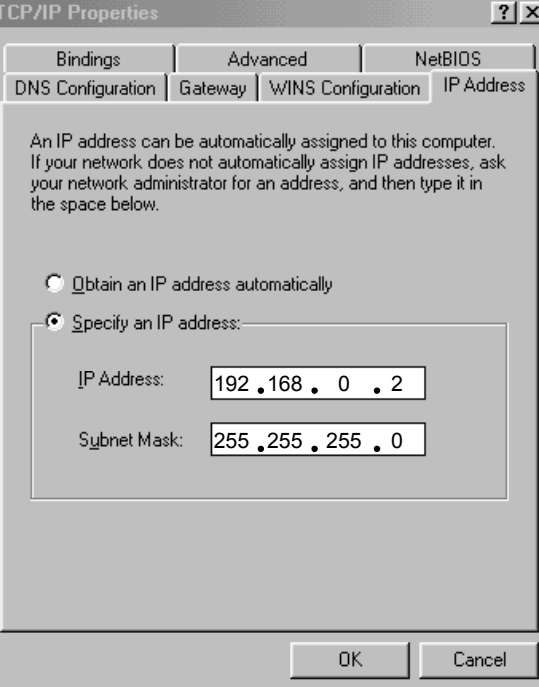
Step	Action
5	<p>Select Internet Protocol (TCP/IP) and click on the  button. A screen similar to the following will be displayed.</p> 
6	<p>Select Use the following IP address. The above screen will change as follows.</p> 

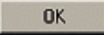
-continued-

Step	Action
7	<p>Enter the appropriate IP address and Subnet mask, then click on the  button.</p> <p>Note: The IP address of the computer should be one number higher or lower than the IP address of the System Manager SP. The Subnet mask should be the same as that of the System Manager SP. There is no need to enter a Default gateway in the computer.</p> <p>Example: System Manager SP IP address is: 192.168.0.1 subnet mask is: 255.255.255.0</p> <p>The computer should be set to IP address: 192.168.0.2 subnet mask: 255.255.255.0</p>
8	<p>Launch <i>Explorer</i> or <i>Netscape</i> and establish the communication with the System Manager SP by entering the IP address of the System Manager SP in the address bar and then pressing the Enter key.</p>
-end-	

Procedure 6.2 – Establishing an Ethernet connection with Windows 98 or 95

Step	Action
1	<p>Click on the My Computer icon on the desktop of your PC. Then, place the cursor on the Network Neighborhood icon and click the right button of your mouse. A screen similar to the following will be displayed.</p> <p>Select TCP/IP -> 3Com EtherLink III PCMCIA (3C589B/3C589C) or the equivalent.</p> 
-continued-	

Step	Action
<p>2</p>	<p>Click on the  button. A screen similar to the following will be displayed.</p>  <p>The screenshot shows the 'TCP/IP Properties' dialog box with the 'IP Address' tab selected. The text reads: 'An IP address can be automatically assigned to this computer. If your network does not automatically assign IP addresses, ask your network administrator for an address, and then type it in the space below.' The 'Obtain an IP address automatically' radio button is selected. Below it, the 'Specify an IP address:' section is visible but empty, with fields for 'IP Address' and 'Subnet Mask'.</p>
<p>3</p>	<p>Select Specify an IP address. The previous screen will change as follows.</p>  <p>The screenshot shows the same 'TCP/IP Properties' dialog box. The 'Specify an IP address:' radio button is now selected. The 'IP Address' field contains the text '192.168.0.2' and the 'Subnet Mask' field contains the text '255.255.255.0'.</p>
<p>–continued–</p>	


Step	Action
4	<p>Enter the appropriate “IP Address” and “Subnet Mask” and click on the  button.</p> <p>Note: The IP address of the computer should be one number higher or lower than the IP address of the System Manager SP. The Subnet mask should be the same as the System Manager SP.</p> <p>Example:</p> <p>System Manager SP IP address is: 192.168.0.1 subnet mask is: 255.255.255.0</p> <p>The computer should be set to IP address: 192.168.0.2 subnet mask: 255.255.255.0</p>
5	<p>Launch <i>Explorer</i> or <i>Netscape</i> and establish the communication with the System Manager SP by entering the IP address of the System Manager SP in the address bar and then pressing the Enter key.</p>
-end-	

Note: It is possible to change the IP address of the System Manager SP in System Settings once in the GUI (see section 5.6.5.20 in the previous Chapter).

Once the communication is established, the GUI will display the Home screen illustrated in screen 1 of section 5.6.1 in the previous Chapter 5. You are now ready to navigate through the GUI as described in Chapter 5.

6.4.3. Modem communication

6.4.3.1. Making the connection

	<p>CAUTION Protection the equipment against damages</p> <p>Before connecting a modem cable into the RS-232 connector of the System Manager SP, ensure that the frame ground and/or BRR cable for the system is/are connected.</p>
---	--

Note: When an external modem operating from a 10 V dc source is used, it is possible to power it from the System Manager SP by connecting it to the Modem Power terminal strip illustrated in Figure 5.3.

To establish a connection between a PC and the System Manager SP, proceed as follows:

- set the modem DIP switches as required (see example in Table 6.1),

- make the modem settings in the System Manager SP as described in Procedure 6.3 (see note below), and
- connect as described in Procedure 6.4.

Note: It is required to access the System Manager SP through an Ethernet connection as described in Procedure 6.1 or Procedure 6.2 and as described in the following procedure in order to make the modem settings in the GUI of the System Manager SP. Refer also to sections 5.6.5.21 and 5.6.5.22 in Chapter 5.

Table 6.1 – Typical modem DIP switch settings (USR Courier shown)

Parameter	Setting
DTR normal/DTR always on	DTR always on
Verbal result codes/Numeric result codes	Verbal result codes
Suppress result codes/Display result codes	Display result codes
Echo offline commands/No echo, offline commands	Echo offline commands
Auto answer on ring/Suppress auto answer	Auto answer on ring
Normal carrier detect/Carrier detect override	Normal carrier detect
Display all result codes/Result codes orig. mode only	Display all result codes
Disable AT command set/Enable AT command set	Enable AT command set
Disconnect with +++/No disconnect with +++	Disconnect with +++
Load NVRAM defaults/Load &FO settings	Load NVRAM defaults



Procedure 6.3 – Modem settings in the System Manager SP


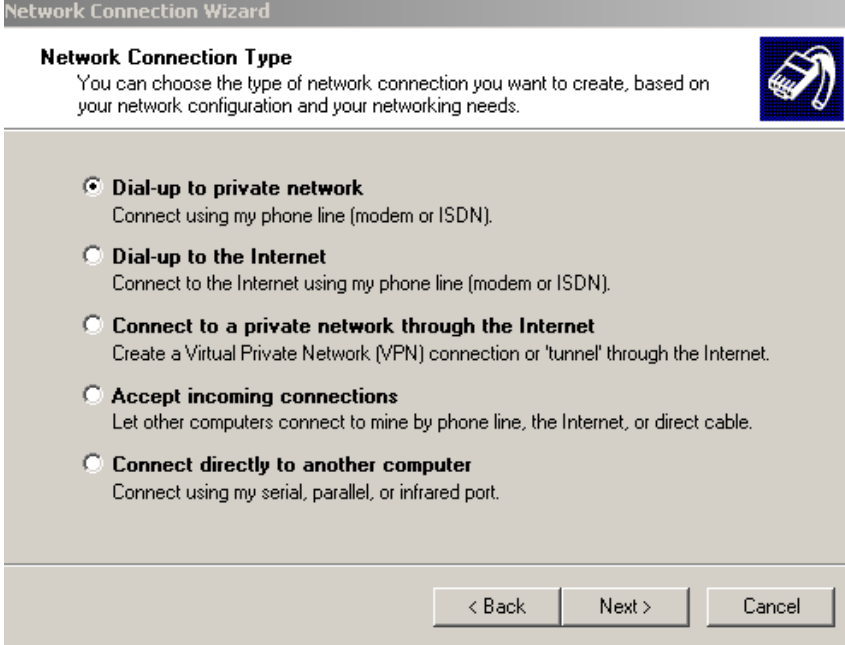
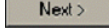
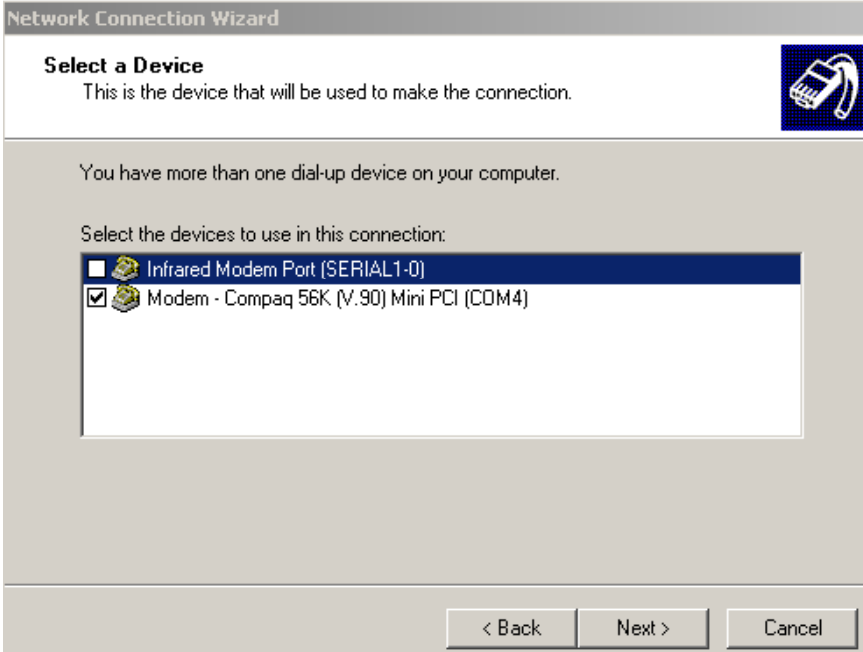
Step	Action
1	<p>In Settings \ System Manager SP \ EEM Settings \ General Settings \ Communication Mode, change Media Selection for None as shown in this screen.</p> <p>General Main Computer Settings</p> <div style="border: 1px solid black; padding: 10px; background-color: #ffffcc;"> <p>-- Communication Mode --</p> <p>Report In Use: <input type="button" value="No"/> <input type="button" value="Yes"/></p> <p>Callback In Use: <input type="button" value="No"/> <input type="button" value="Yes"/></p> <p>Media Selection: <input type="button" value="None"/> <input type="text" value=""/> ▾</p> <p style="text-align: right;"><input type="button" value="Apply"/></p> </div> <p style="text-align: center;">–continued–</p>


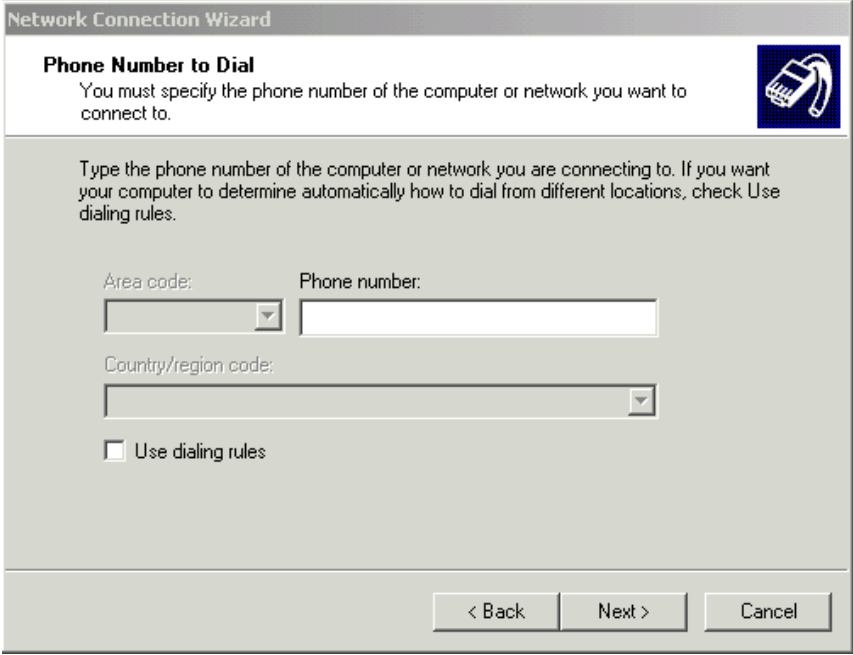
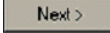
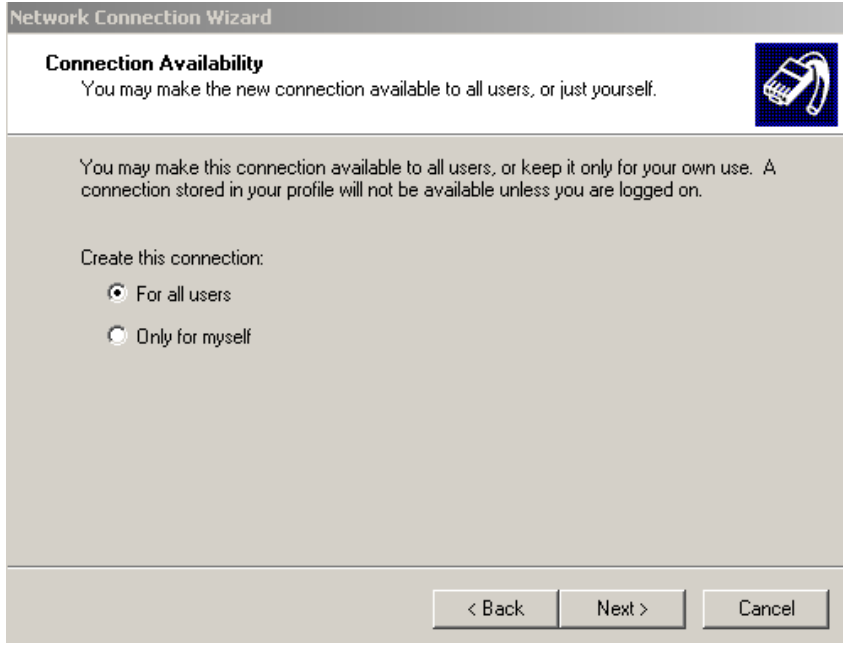
Step	Action
<p>2</p>	<p>In Settings \ System Manager SP \ PPP Settings \ General Settings \ Communication Mode, change Media Selection for PSTN Modem as shown in this screen.</p> <p>General PPP Settings</p> <div data-bbox="516 527 1406 829" style="border: 1px solid black; padding: 5px;"> <p>-- Communication Mode --</p> <p>PPP in use: <input type="button" value="Disabled"/> <input type="button" value="Enable"/></p> <p>Media Selection: <input type="text" value="PSTN Modem"/> <input type="button" value="v"/></p> <p style="text-align: right;"><input type="button" value="Apply"/></p> <p><small>Enable and Disable PPP needs a restart of the System Manager SP.</small></p> </div>
<p>3</p>	<p>In Settings \ System Manager SP \ PPP Settings \ General Settings \ Communication Mode, enable PPP in use as shown in this screen.</p> <p>General PPP Settings</p> <div data-bbox="516 1031 1406 1333" style="border: 1px solid black; padding: 5px;"> <p>-- Communication Mode --</p> <p>PPP in use: <input type="button" value="Enabled"/> <input type="button" value="Disable"/></p> <p>Media Selection: <input type="text" value="PSTN Modem"/> <input type="button" value="v"/></p> <p style="text-align: right;"><input type="button" value="Apply"/></p> <p><small>Enable and Disable PPP needs a restart of the System Manager SP.</small></p> </div>
<p>4</p>	<p>In Settings \ System Manager SP \ PPP Settings \ TCP/IP Settings, apply Set Factory Default Setting as shown in this screen.</p> <div data-bbox="516 1444 1406 1621" style="border: 1px solid black; padding: 5px;"> <p>-- TCP/IP Factory Default --</p> <p>Set Factory Default Settings: <input type="button" value="Apply"/></p> <p><small>Using this function will restore the system to TCP/IP factory default settings. All TCP/IP settings made will be lost.</small></p> </div>
<p>–continued–</p>	

Step	Action
5	<p>The settings should be as shown in this screen.</p> <p>PPP Interface TCP/IP Settings</p> <div data-bbox="516 443 1386 699" style="border: 1px solid black; padding: 5px;"> <p>-- TCP/IP Settings --</p> <p>PPP Interface IP Address: 206.86.223.7 <input type="text"/> . <input type="text"/> . <input type="text"/> . <input type="text"/></p> <p>PPP Interface Subnet Mask: 255.255.255.0 <input type="text"/> . <input type="text"/> . <input type="text"/> . <input type="text"/></p> <p>PPP Interface Gateway Address: 204.156.128.1 <input type="text"/> . <input type="text"/> . <input type="text"/> . <input type="text"/></p> <p style="text-align: right;"><input type="button" value="Apply"/></p> </div>
6	<p>In Settings \ System Manager SP \ PPP Settings \ PSTN Modem Settings, apply Set Factory Default Setting as shown in this screen.</p> <div data-bbox="516 779 1386 982" style="border: 1px solid black; padding: 5px;"> <p>-- PSTN Modem Factory Default --</p> <p>Set Factory Default Settings: <input type="button" value="Apply"/></p> <p>Using this function will restore the system to PSTN modem factory default settings. All PSTN modem settings made will be lost.</p> </div>
-end-	

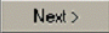
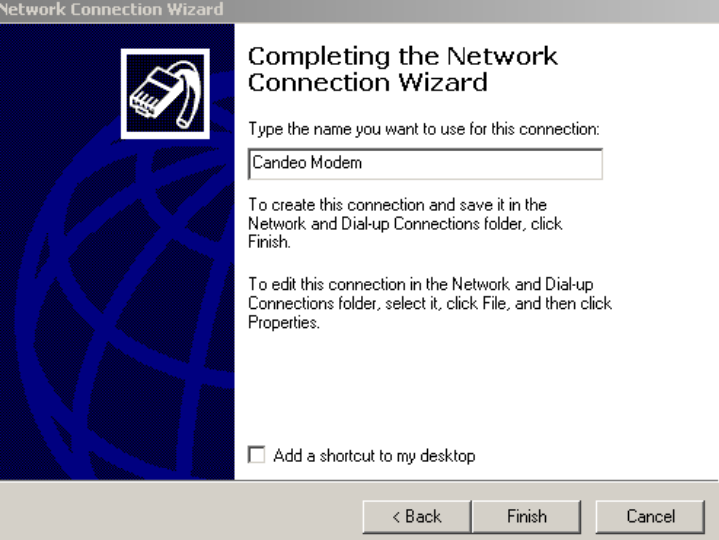


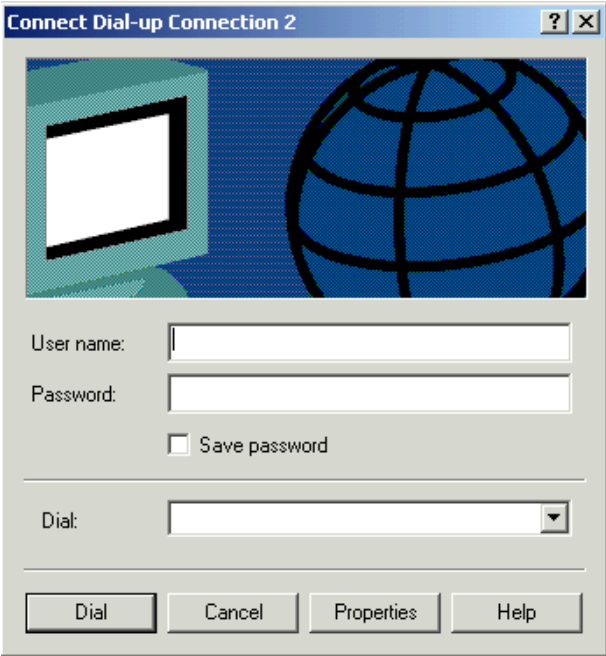
Procedure 6.4 – Making a modem connection using Windows 2000

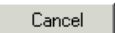
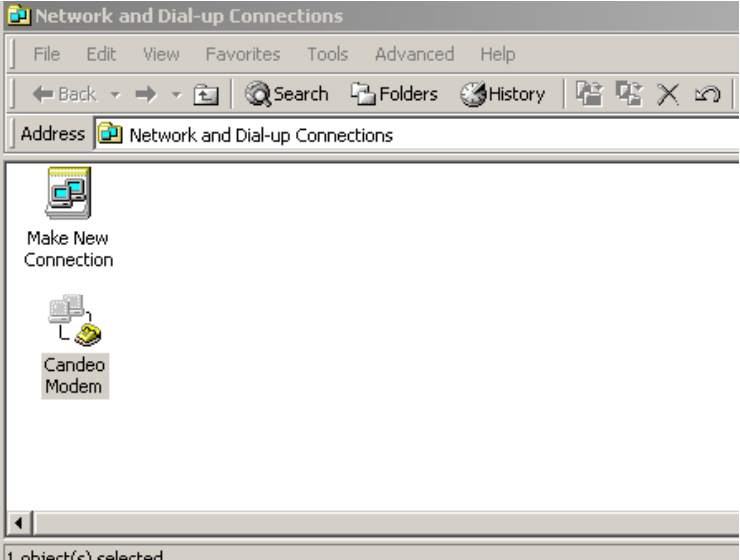
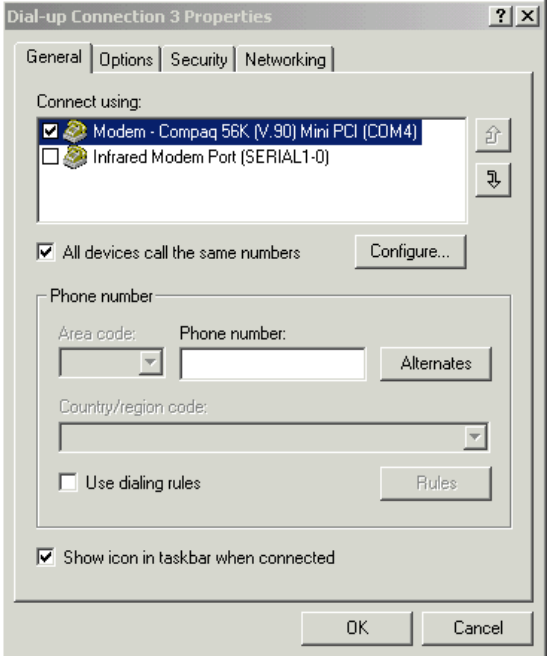
Step	Action
1	<p>In the screen of your PC click on the  Start button. Select Settings, Control Panel, Network and Dial-up Connections, and Make New Connection. The following screen will be displayed.</p> <div data-bbox="618 1276 1312 1801" style="border: 1px solid gray; padding: 10px;"> <p>Network Connection Wizard</p> <div style="display: flex;"> <div style="flex: 1; background-color: #000080; color: white; padding: 10px; text-align: center;">  </div> <div style="flex: 2; padding-left: 10px;"> <p>Welcome to the Network Connection Wizard</p> <p>Using this wizard you can create a connection to other computers and networks, enabling applications such as e-mail, Web browsing, file sharing, and printing.</p> <p>To continue, click Next.</p> </div> </div> <p style="text-align: right;"> <input type="button" value=" < Back"/> <input type="button" value=" Next >"/> <input type="button" value=" Cancel"/> </p> </div>
-continued-	

Step	Action
2	<p>Click on the  button. A screen similar to the following will be displayed.</p> 
3	<p>Select Dial-up to private Network and click on the  button. A screen similar to the following will be displayed.</p> 
<p>–continued–</p>	

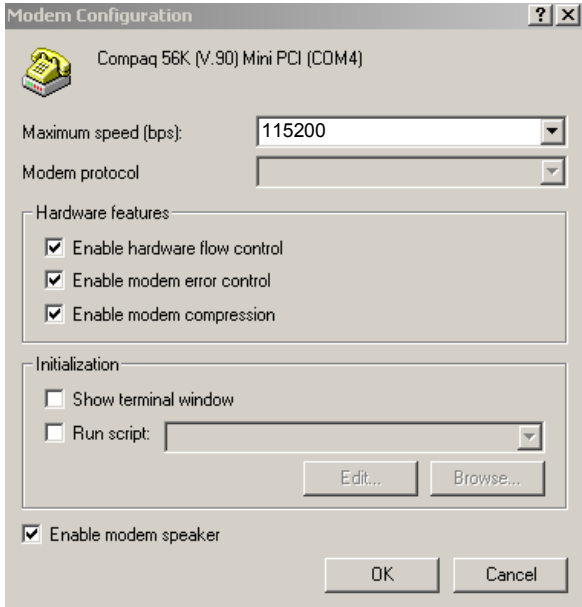
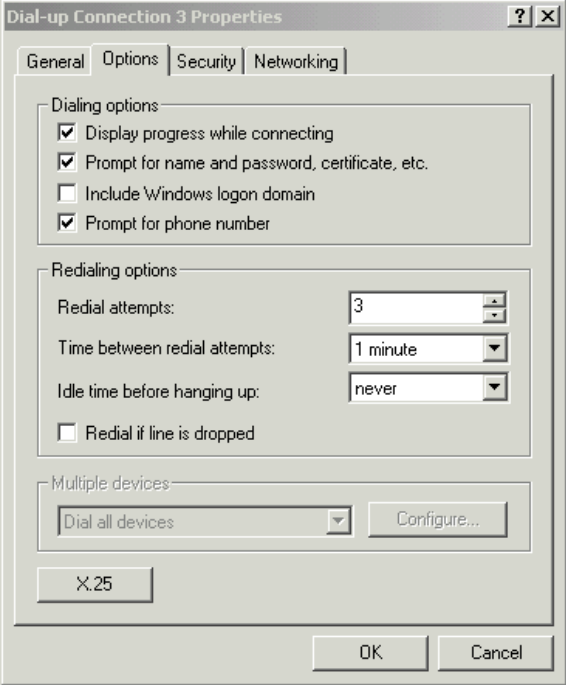
Step	Action
<p>4</p>	<p>Select Modem – Compaq 56K (V.90) Mini PC1 (COM4) and click on the  button. A screen similar to the following will be displayed.</p> 
<p>5</p>	<p>In the “Phone number” window enter the number of the computer or network you want to connect to and click on the  button. A screen similar to the following will be displayed.</p> 

–continued–

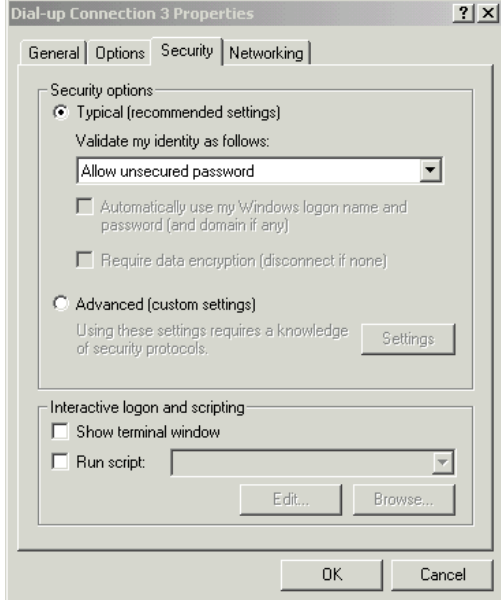

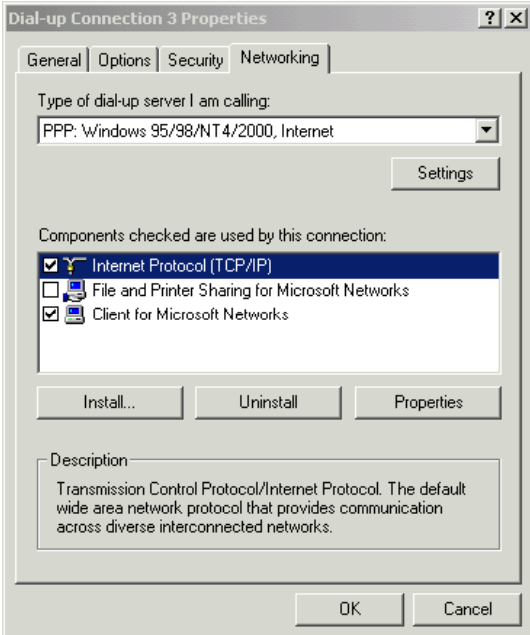
Step	Action
<p>6</p>	<p>Select For all users or Only for Myself, as desired, and click on the  button. A screen similar to the following will be displayed.</p>  <p>Enter a name, for example Candeo Modem, in the “Type the name you want to use for this connection” window.</p> <p>Note: If you do not enter a name in this window the  button will not be active.</p>
<p>7</p>	<p>Click on the  button. The following screen will be displayed.</p>  <p style="text-align: center;">-continued-</p>

Step	Action
<p>8</p>	<p>Click on the  button. An icon, bearing the name you entered in step 6, will be added in your Network and Dial-up Connections screen. On the desktop of your PC, click on the My Computer icon, on the Control Panel icon, and on the Network and Dial-up Connections icon. A screen similar to the following will be displayed.</p> 
<p>9</p>	<p>Place the cursor on the icon that you created and click the right button of your mouse. In the pop-up window that is displayed select Properties. A screen similar to the following will be displayed.</p> 


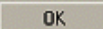
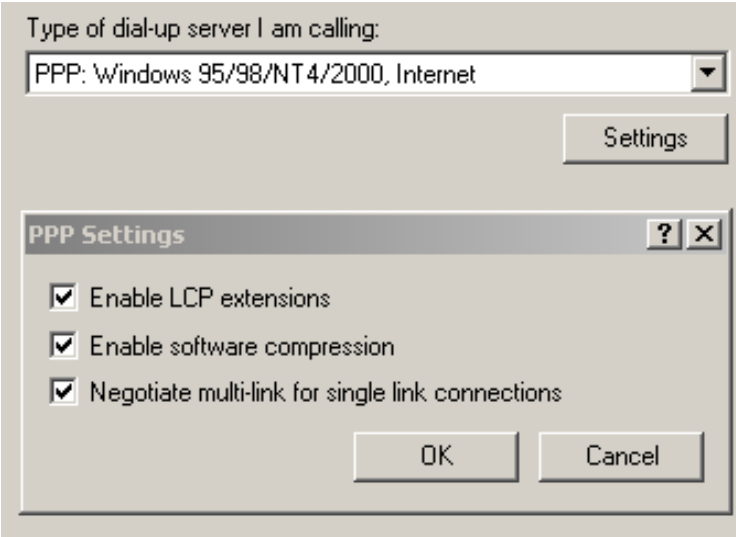
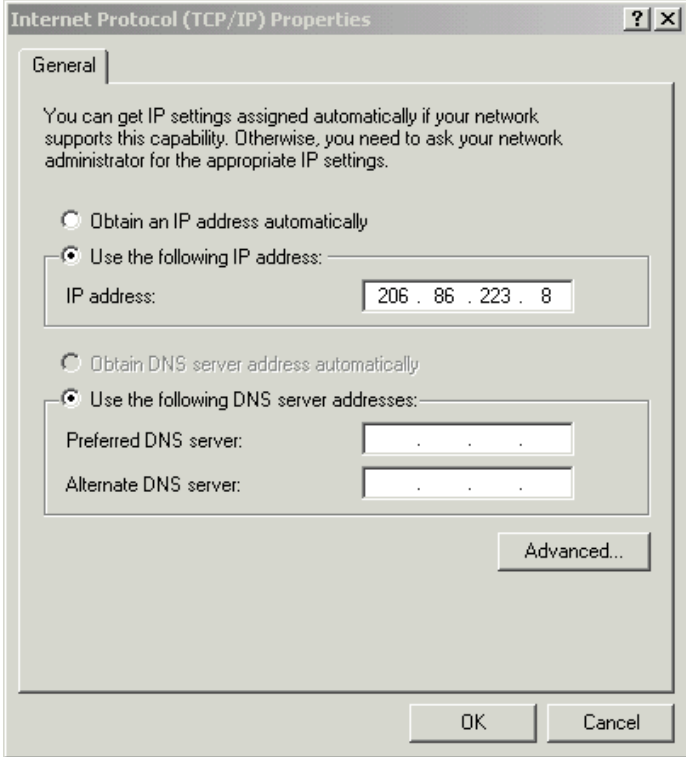
-continued-

Step	Action
<p>10</p>	<p>Select Modem – Compaq 56K (V.90) Mini PC1 (COM4) and click on the Configure... button. A screen similar to the following will be displayed. In the “Maximum speed (bps)” window enter the appropriate speed.</p> 
<p>11</p>	<p>Select the “Hardware features” and other features as desired. Click on the Options tab. A screen similar to the following will be displayed.</p> 

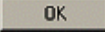
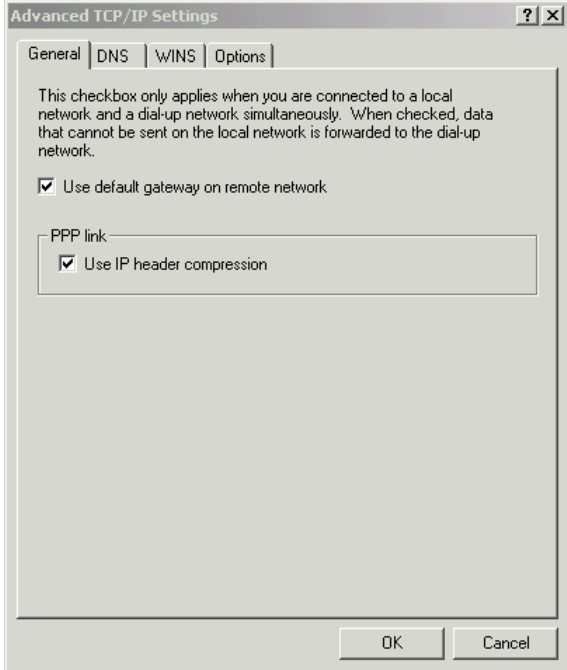
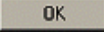
–continued–

Step	Action
<p>12</p>	<p>Enter options in the various fields as required. A screen similar to the following will be displayed.</p> <p>Enter security options in the various fields as required.</p> 
<p>13</p>	<p>Click on the Networking tab. A screen similar to the following will be displayed.</p> <p>Select the “Type of dial-up server I am calling” by clicking on the  button.</p> 

–continued–

Step	Action
<p>14</p>	<p>Click on the  button. The following pop-up window will be displayed. Choose the PPP settings as required and click on the  button to close the pop-up window.</p> 
<p>15</p>	<p>Click on the Properties button. A screen similar to the following will be displayed.</p> 

-continued-

Step	Action
<p>16</p>	<p>Click on the Advanced button. A screen similar to the following will be displayed. Select “Use default gateway on remote network” and click on the  button.</p> 
<p>17</p>	<p>Click on the  buttons to close the Internet Protocol (TCP/IP) Properties and Dial-up Connection screens respectively.</p>
<p>18</p>	<p>Launch <i>Explorer</i> or <i>Netscape</i> and establish the communication with the System Manager SP.</p>
<p>–end–</p>	

Once the communication is established, the GUI will display the Home screen illustrated in screen 1 of section 5.6.1 in the previous Chapter 5. You are now ready to navigate through the GUI as described in Chapter 5.

7. Maintenance

7.1. Routine maintenance

The following is a list of general preventive maintenance procedures, which should be performed periodically as required according to the environmental conditions and customer maintenance policy to ensure trouble free operation of your Candeco *SP* 48300 power system:

- clean all ventilation openings,
- replace air filters, if provided, on the rectifiers,
- tighten all electrical connections,
- check for hot fuses or breakers (loose, undersized or overloaded),
- verify that all rectifiers are operating normally (green LED on and fan operating),
- verify alarm thresholds,
- verify operational settings.

The following test equipment is required when verifying the Candeco *SP* 48300 power system:

- digital voltmeter, Fluke 8050A or equivalent,

7.2. Troubleshooting

The following sections provide information for troubleshooting alarm conditions on the Candeco *SP* 48300 power system.

7.2.1. Troubleshooting the Controller *SP*

The following Table lists the alarms that may occur on a Candeco *SP* 48300 power system equipped with a Controller *SP*, and identifies their severity as well as the conditions that cause them.

Table 7.1 – Alarms generated by the Controller SP

Severity	Possible causes	Action
MAJOR (red): extended over the MJ relay contacts	AC failure: AC supply failed or out of range for the rectifiers (also extended over O1 relay contacts)	Verify if there is an ongoing AC outage or if circuit breaker(s) has(have) trip at the AC panel.
	BOD alarm: ongoing discharge of the batteries (<-51 V dc) (also extended over O1 relay contacts)	Verify if there is an ongoing AC outage or if the rectifier capacity is sufficient for the load.
	Controller fail alarm: failure of the controller SP (controller status red)	Verify that the controller settings are correct and that there is no communication fault.
	FA alarm: distribution or battery fuse blown or circuit breaker tripped	Verify for the cause of the activation: short-circuit, overload, etc.
	High battery temperature alarm: the sensor at the batteries has detected a high temperature condition ($\geq 40^{\circ}\text{C}$)	Verify for the cause of the high temperature condition (defective or misadjusted heating system, bad ventilation, direct sunlight, etc.).
	HV alarm: ongoing high voltage condition (>-56 V dc)	Verify for the cause of the high voltage condition (defective rectifier, incorrect controller settings, etc.)
	LVD alarm: the system has initiated a low voltage disconnect	LVD 'Contactor' status is OPEN.
	LV alarm: ongoing low voltage condition (<-47 V dc for more than 15 seconds) (also extended over O1 relay contacts)	Verify if there is an ongoing AC outage or if the rectifier capacity is sufficient for the load.
	RFA Major alarm: failure of two or more rectifiers	If on all rectifiers, verify if there is an ongoing AC outage or HVSD condition. Otherwise, verify for specific cause per Table 4.1.
MINOR (yellow): extended over the MN relay contacts	Battery temperature probe fail	Check sensor range [-45°C to $+100^{\circ}\text{C}$].
	Fan fail alarm: failure of the fan on one or more rectifiers (yellow on controller, flashing yellow on defective rectifier)	Replace the fan module (see Procedure 7.5).
	Low battery temperature alarm: the sensor at the batteries has detected a low temperature condition ($\leq 0^{\circ}\text{C}$)	Verify for the cause of the low temperature condition (defective or misadjusted cooling system, open door/louvers during winter, etc.).
	RFA Minor alarm: failure of one rectifier	Verify for specific cause per Table 4.1.
	Rectifier high temperature alarm: high temperature condition detected inside one or more rectifiers	Verify for the cause of the high temperature condition (ambient high temperature, defective fan, obstructed ventilation openings, etc.).

Refer to Chapter 4 for the definition of the LED indicators on each individual module of the Candeo SP 48300 power system.

7.2.2. Troubleshooting the System Manager SP

The System Manager SP provides 38 different alarms, which are listed in screen 27, in Chapter 5. Relay outputs 1, 2 and 3 are factory configured as follows: all major alarms are concentrated on the relay output 1, all minor alarms are concentrated on the relay output 2, while observation alarms are concentrated relay output 3. However, relay outputs 1, 2 and 3 can be

reassigned in the field, and relay outputs 4 to 8 can be configured in the field to meet specific customer requirements.

In addition to the severity of the alarm displayed on the front of the unit, the local GUI allows the user to see some details on the alarm conditions on the LCD screen on the front panel of the unit (refer to section 5.5.5 in Chapter 5). If more detailed information is required, access to the remote GUI with a computer is the next option (refer to section 5.6 in Chapter 5).

7.3. Replacement of Candeco SP 48300 components

The following subsections cover the procedures to be followed when replacing various components in a Candeco SP 48300 power system.

7.3.1. Replacing a Candeco SP 48300 controller

Replace a Controller SP as described in the following procedure.

Procedure 7.1 – Replacing a Controller SP

Step	Action
1	Notify the alarm center of the possibility of incoming alarms during this procedure.
2	Use a flat blade screwdriver to release the captive screw on the Controller SP to be replaced.
3	Carefully slide the Controller SP partially out of the shelf and disconnect the three output relay connectors, taking note of the exact location of each connector and marking it accordingly. Refer to Figure 5.1.
4	Pull the Controller SP completely out of the shelf.
5	Set all the DIP switches on the new Controller SP to exactly the same position as these on the removed Controller SP. Refer to Figure 5.1.
6	Slide the new the Controller SP partially into the shelf.
7	Reconnect all the wires disconnected per step 3 (see Figure 5.1) on the new Controller SP and carefully slide it into position, making sure that it is fully inserted.
8	Tighten the captive screw to secure the new Controller SP into position.
9	Wait until the Controller SP has finished booting, then press the “Refresh” button on the Controller SP for 5 seconds. All units communicating with the Controller SP will flash their operational LED for 5 seconds. The Controller SP will flash the Controller Status LED while reconfiguring, and then remain steady when reconfiguration is completed.
10	Notify the alarm center of the completion of this procedure.
–end–	

Replace a System Manager *SP* as described in the following procedure.

Procedure 7.2 – Replacing a System Manager *SP*

Step	Action
1	Notify the alarm center of the possibility of incoming alarms during this procedure.
2	Use a flat blade screwdriver to release the captive screw on the System Manager <i>SP</i> to be replaced.
3	Carefully slide the System Manager <i>SP</i> partially out of the shelf and disconnect all the connectors from it, taking note of the exact location of each connector and marking it accordingly. Refer to Figure 5.3.
4	Pull the System Manager <i>SP</i> completely out of the shelf.
5	Slide the new the System Manager <i>SP</i> partially into the shelf.
6	Reconnect all the connectors disconnected per step 3 on the new System Manager <i>SP</i> and carefully slide it into position, making sure that it is fully inserted.
7	Tighten the captive screw to secure the new System Manager <i>SP</i> into position.
8	Wait until the Controller <i>SP</i> has finished booting, then press the “Refresh” button on the System Manager <i>SP</i> for 5 seconds. All units communicating with the System Manager <i>SP</i> will flash their operational LED for 5 seconds. The System Manager <i>SP</i> will flash the Controller Status LED while reconfiguring, and then remain steady when reconfiguration is completed.
9	Notify the alarm center of the completion of this procedure.
–end–	

7.3.2. Upgrading a Candeco *SP* power system from a Controller *SP* to a System Manager *SP*

Replace a Controller *SP* by a System Manager *SP* as described in the following procedure.

Procedure 7.3 – Replacing a Controller *SP* by a System Manager *SP*

Step	Action
1	Notify the alarm center of the possibility of incoming alarms during this procedure.
2	Use a flat blade screwdriver to release the captive screw on the Controller <i>SP</i> to be replaced.
3	Carefully slide the Controller <i>SP</i> partially out of the shelf and disconnect all the connectors from it, taking note of the exact location of each connector and marking it accordingly. Refer to Figure 5.1.
4	Pull the Controller <i>SP</i> completely out of the shelf.
5	Slide the new System Manager <i>SP</i> partially into the shelf.
–continued–	

Step	Action
6	Reconnect the connectors disconnected from the Controller <i>SP</i> per step 3 to the new System Manager <i>SP</i> as follows: <ul style="list-style-type: none"> connector from Major on the Controller <i>SP</i> to Relay output 1 on the System Manager <i>SP</i>, connector from Minor on the Controller <i>SP</i> to Relay output 2 on the System Manager <i>SP</i>, connector from O1 on the Controller <i>SP</i> to Relay output 3 on the System Manager <i>SP</i>.
7	Connect any other wires as required per your specifications to the new System Manager <i>SP</i> and carefully slide it into position, making sure that it is fully inserted.
8	Tighten the captive screw to secure the new System Manager <i>SP</i> into position.
9	Wait until the Controller <i>SP</i> has finished booting, then press the “Refresh” button on the new System Manager <i>SP</i> for 5 seconds. All units communicating with the new System Manager <i>SP</i> will flash their operational LED for 5 seconds. The new System Manager <i>SP</i> will flash the Controller Status LED while configuring, and then remain steady when configuration is completed.
10	Notify the alarm center of the completion of this procedure.
–end–	

7.3.3. Replacing a Rectifier –48 V dc, 1500 W

Replace a Rectifier –48 V dc, 1500 W as described in Procedure 7.4.

Procedure 7.4 – Replacing a Rectifier –48 V dc, 1500 W

Step	Action
1	Notify the alarm center of the possibility of incoming alarms during this procedure.
2	Use a flat blade screwdriver to release the captive screw on the rectifier to be replaced.
3	Carefully slide the rectifier out of the shelf.
4	Carefully slide the new rectifier into position, making sure that it is fully inserted. The rectifier will start operating as soon as the AC connector is making contact.
5	Tighten the captive screw to secure the new rectifier into position.
6	If the green LED flashes on the new rectifier, press the “Refresh” button on the controller for 5 seconds. All units communicating with the controller will flash their operational LED for 5 seconds. The controller will flash the Controller Status LED while reconfiguring, and then remain steady when reconfiguration is completed.
7	Verify that the new rectifier is operating normally (green LED ON and fan rotating).
8	Notify the alarm center of the completion of this procedure.
–end–	

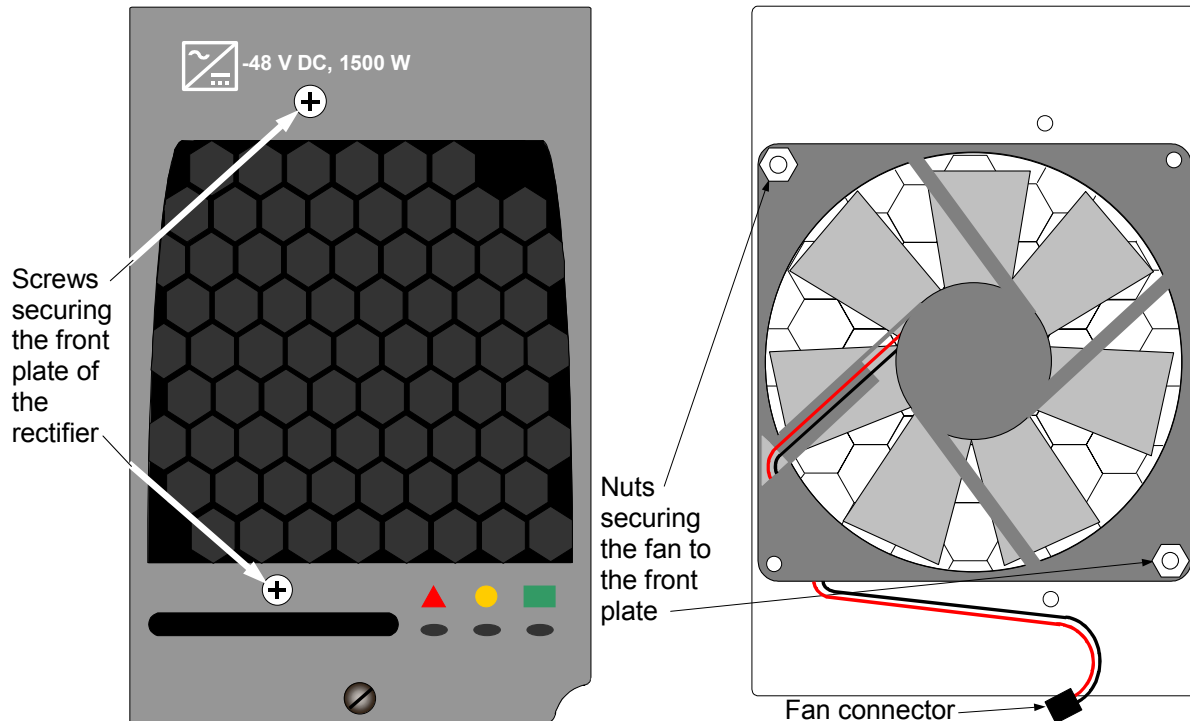
7.3.4. Replacing the cooling fan on a Rectifier –48 V dc, 1500 W

Replace the cooling fan on a Rectifier –48 V dc, 1500 W as described in the following procedure and as illustrated in Figure 7.1.

Procedure 7.5 – Replacing the cooling fan on a Rectifier –48 V dc, 1500 W

Step	Action
1	Notify the alarm center of the possibility of incoming alarms during this procedure.
2	Use a flat blade screwdriver to release the captive screw on the rectifier on which the fan is to be replaced.
3	Slide the rectifier out of the shelf carefully.
4	Place the rectifier on a flat work surface.
5	Use a flat Phillips screwdriver to remove the two mounting screws securing the front plate of the rectifier in place and carefully pull on the front plate. Refer to Figure 7.1.
6	Unplug the fan from the PC board inside the rectifier. Refer to Figure 7.1.
7	Remove the two nuts securing the fan to the back of the front plate and remove the fan. Refer to Figure 7.1.
8	Install the replacement fan and secure in to the font plate using the two nuts removed in step 7. Refer to Figure 7.1.
9	Plug the fan to the PC board inside the rectifier. Refer to Figure 7.1.
10	Reinstall the front plate of the rectifier and secure it in place with the two mounting screws removed in step 5. Refer to Figure 7.1.
11	Carefully slide the rectifier back into position, making sure that it is fully inserted. The rectifier will start operating as soon as the AC connector is making contact.
12	Tighten the captive screw to secure the new rectifier into position.
13	If the green LED flashes on the new rectifier, press the “Refresh” button on the controller for 5 seconds. All units communicating with the controller will flash their operational LED for 5 seconds. The controller will flash the Controller Status LED while reconfiguring, and then remain steady when reconfiguration is completed.
14	Verify that the new fan operates normally.
15	Verify that the new rectifier is operating normally (green LED ON and fan rotating).
16	Notify the alarm center of the completion of this procedure.
–end–	

Figure 7.1 – Replacing the cooling fan on a Rectifier –48 V dc, 1500 W



7.3.5. Replacing a distribution circuit breaker or fuse

Replace a distribution circuit breaker or fuse as described in the following procedure.

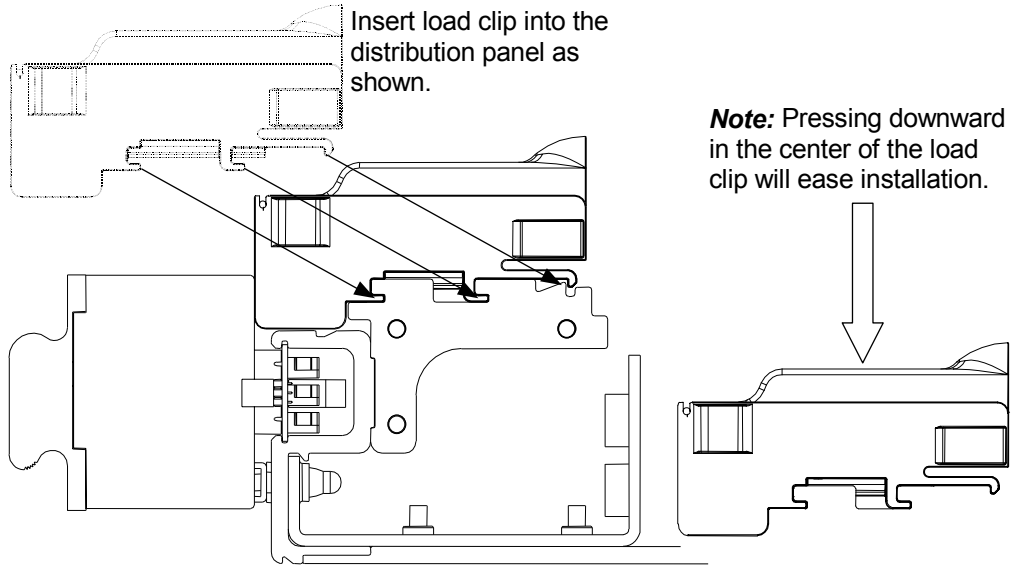
Procedure 7.6 – Replacing a distribution circuit breaker or fuse block

Step	Action
1	Notify the alarm center of the possibility of incoming alarms during this procedure.
2	Open the front cover of the distribution panel in which the distribution circuit breaker or fuse block to be replaced is located.
3	Insure that the circuit breaker to be replaced is in the OFF position or that the fuse has been removed in the fuse block to be replaced.
4	Pull firmly on the distribution circuit breaker or fuse block to be replaced until it disconnects from the main DC rail and the associated load clip.
5	Push firmly on the new distribution circuit breaker or fuse block until its bullet contacts are fully inserted into the main DC rail and the associated load clip.
6	Operate the new circuit breaker to ON or reinstall the fuse in the new fuse block as required.
7	Insure that there is no outstanding alarm.
8	Notify the alarm center of the completion of this procedure.
–end–	

7.3.6. Installing / removing load clips in a Candeo SP Distribution panel

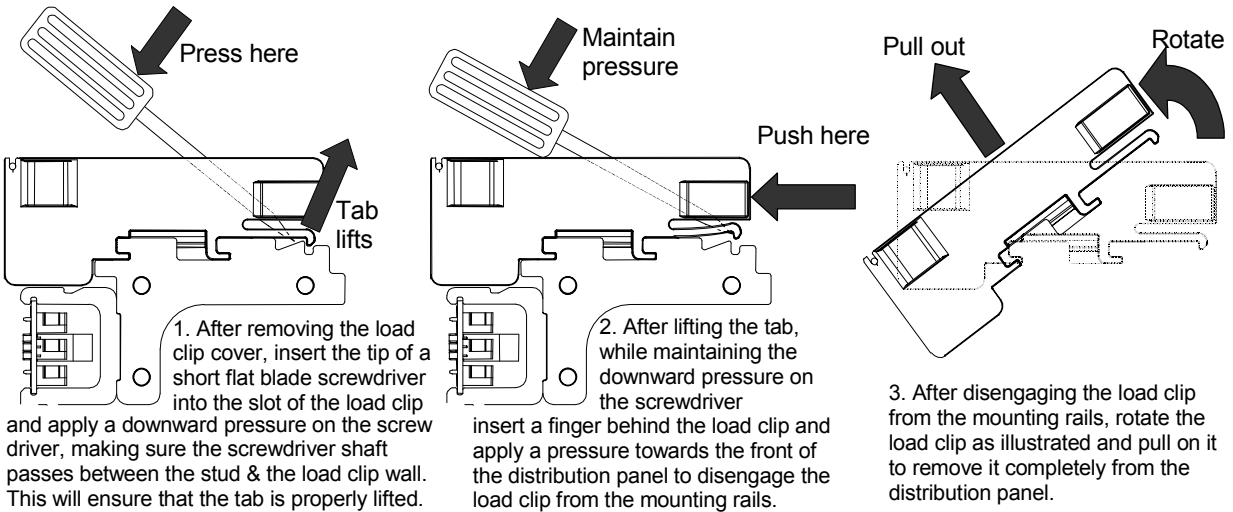
Install load clips in a Candeo SP Distribution panel as shown in Figure 7.2.

Figure 7.2 – Installing load clips in a distribution panel



Remove load clips from a Candeo SP Distribution panel as shown in Figure 7.3.

Figure 7.3 – Removing load clips from a distribution panel



7.4. Addition of Candeo SP 48300 components

The following subsections cover the procedures to be followed when adding various components to an existing Candeo SP 48300 power system.

Note: The procedures in the following subsections involve work on a live power system. Refer to the important **CAUTION** and **WARNING** boxes in section 1.5 of this manual before starting these procedures

7.4.1. Adding a Rectifier –48 V dc, 1500 W to a live power system

Add a Rectifier –48 V dc, 1500 W to a live Candeo SP 48300 power system as described in the following procedure.

Procedure 7.7 – Adding a Rectifier –48 V dc, 1500 W to a live system

Step	Action
1	Notify the alarm center possible incoming alarms during this procedure.
2	Remove the blank plate in the position where the new rectifier is to be installed.
3	Carefully slide the new rectifier into position, making sure that it is fully inserted. The rectifier will start when the AC contacts are making.
4	Tighten the captive screw to secure the new rectifier into position.
5	If the green LED flashes on the new rectifier, press the “Refresh” button on the controller for 5 seconds. All units communicating with the controller will flash their operational LED for 5 seconds. The controller will flash the Controller Status LED while reconfiguring, and then remain steady when reconfiguration is completed.
6	Verify that the new rectifier is operating normally (green LED ON and fan rotating).
7	Notify the alarm center of the completion of this procedure.
–end–	

7.4.2. Adding a supplementary distribution panel

Add a supplementary distribution panel to a Candeo SP 48300 power system in the field as described in the following procedure.

Procedure 7.8 – Adding a supplementary distribution panel

Step	Action
1	Notify the alarm center of the possibility of incoming alarms during this procedure.
2	Open the front cover of the existing distribution panel and remove it by forcing it slightly to one side to disengage the hinge pin on the opposite side, then sliding it the other way to disengage the second hinge pin.
3	Remove the front cover of the new supplementary distribution panel in the same manner.
4	Remove the top cover of the existing distribution panel.
–continued–	

Step	Action
5	If the system is accessible from the rear, remove also the rear covers of the existing distribution panel and new supplementary distribution panel.
6	Install protective material such as canvas sheets above the existing distribution panel to protect the internal circuitry against falling tools or objects.
7	Install the new supplementary distribution panel against the supporting uprights immediately above the existing distribution panel.
8	Secure the new supplementary distribution panel to the supporting uprights using the four mounting screws and the star washer supplied with the new panel for that purpose. Note: The star washer must be used with one of the mounting screws, preferably in the top right position, in order to maintain a good ground continuity between the uprights and the chassis of the new distribution panel. Refer to Figure 7.4.
9	Remove the protective material installed per step 6 between the two panels, and reinstall it as necessary to protect the live equipment against short circuits while performing the next steps.
10	Taking all the applicable safety measure, install the –48 V and BR+ busbar links between the two distribution panels. Refer to Figure 7.5. Apply a torque value of 6.7 ft-lb (9 N-m) to the bolted connections.
11	Bridge the alarm circuit of the supplementary distribution panel (pin J5) to the alarm circuit of the supplementary distribution panel (pin J5). Refer to Figure 7.7.
12	Ensure that the J2 alarm jumper is set for the appropriate type of circuit breaker that will be used in the panel as described and as shown in Figure 7.6.
13	Remove the protective material installed per step 9.
14	Verify the functionality of the new panel.
15	If applicable, connect the loads to the new panel as described in the appropriate section of installation manual IM6C55A.
16	If the system is accessible from the rear, reinstall the rear covers of the distribution panels removed per step 5.
17	Reinstall the top cover removed from the existing distribution panel per step 4 on top of the new supplementary distribution panel.
18	Reinstall the front cover on the existing and the new distribution panels by reversing the procedure described in step 2.
19	Close the front cover on the existing and the new distribution panels.
20	Notify the alarm center of the completion of this procedure.
–end–	

Figure 7.4 – Star washer installation for ground continuity

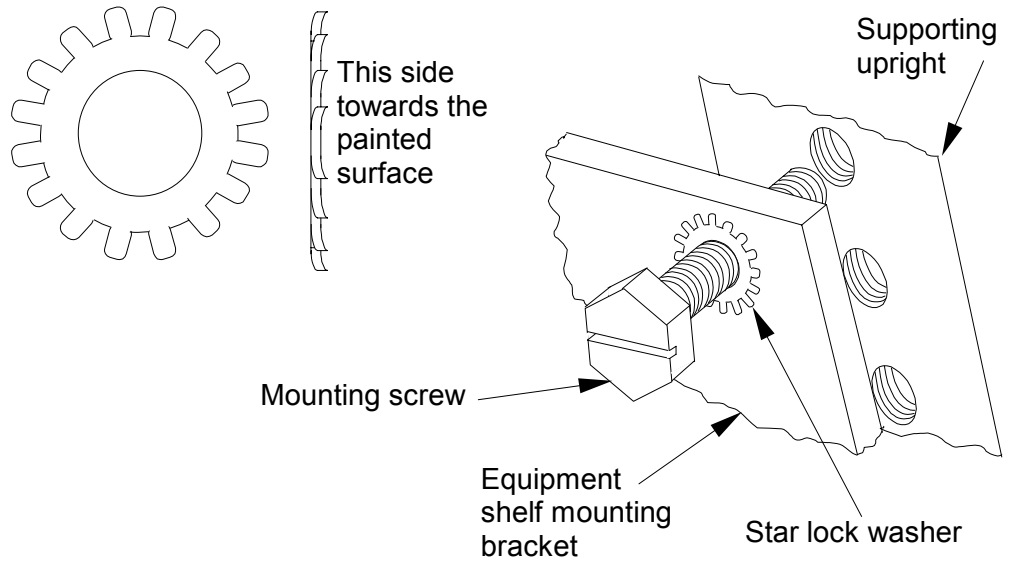
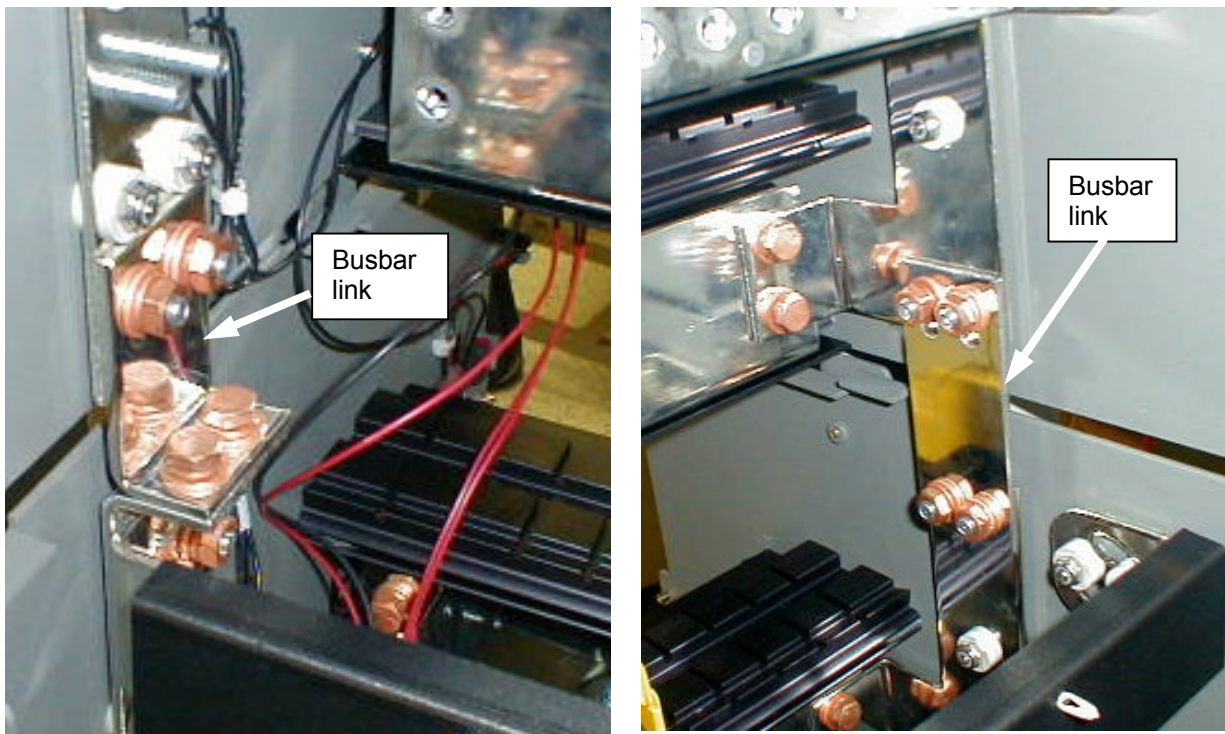


Figure 7.5 – Linking the new supplementary distribution panel to the main distribution panel



Left side, as viewed from rear

Right side, as viewed from rear

Figure 7.6 – Setting the J2 alarm jumper for fuses and mid-trip circuit breaker alarm, or standard trip circuit breaker alarm

Insert the J2 alarm jumper, on the left side of the distribution panel, over the two upper pins for fuses or mid-trip circuit breakers, or over the two lower pins for standard-trip circuit breakers.

On an initial distribution panel, the J4 jumper, on the right side of the panel, is dedicated to the battery circuit breaker alarm and should be set according to the type of circuit breakers used for the batteries.

On a supplementary distribution panel, ensure that the J4 jumper, on the right side of the panel, is removed (preferred) or is in the same position as the J2 jumper (non-preferred).

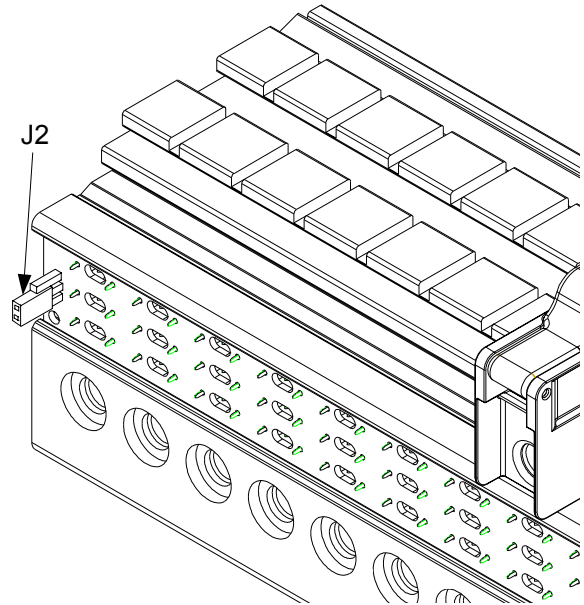
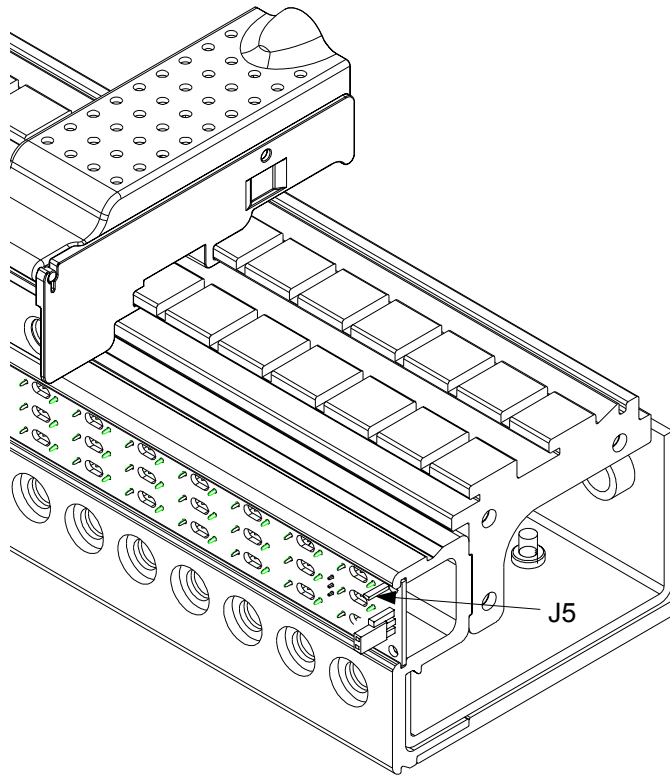


Figure 7.7 – Location of the alarm pin J5 on the distribution panels



Appendix A: Recommended replacement parts

The recommended replacement parts are described below. To order other equipment for a Candeo *SP* 48300 power system, contact your nearest Emerson Energy Systems representative or visit the www.EmersonEnergy-NA.com web site.

Table 8.1 – Controllers

Ordering number	Description
A7000231	Controller <i>SP</i> – AP7C55AA
A7000232	System Manager <i>SP</i> – AP7C56AA

Table 8.2 – Rectifier

Ordering number	Description
A7000230	Candeo <i>SP</i> 48300 Rectifier –48 V dc, 1500 W
P7000250	Candeo <i>SP</i> 48300 Rectifier –48 V dc, 1500 W replacement fan
P7000197	Blank panel for empty rectifier slot

Table 8.3 – Supplementary Distribution Panel

Ordering number	Description
SBKCANDSP-01	Supplementary Distribution Panel –48 V kit

Table 8.4 – Distribution equipment for the Candeo *SP* 48300 distribution panels

Ordering Number	Description
P0914477	Single position load clip kit
P0914481	Double position load clip kit
A0722751	1 A 80 V dc mid trip circuit breaker
A0722752	5 A 80 V dc mid trip circuit breaker
P7000240	5 A mid trip circuit breaker kit*
–continued–	

Ordering Number	Description
A0722754	10 A 80 V dc mid trip circuit breaker
P7000241	10 A mid trip circuit breaker kit*
A0722755	15 A 80 V dc mid trip circuit breaker
P7000242	15 A mid trip circuit breaker kit*
A0722695	20 A 80 V dc mid trip circuit breaker
P7000243	20 A mid trip circuit breaker kit*
A0722707	25 A 80 V dc mid trip circuit breaker
P7000244	25 A mid trip circuit breaker kit*
A0722715	30 A 80 V dc mid trip circuit breaker
P7000245	30 A mid trip circuit breaker kit*
A0722717	35 A 80 V dc mid trip circuit breaker
A0722721	40 A 80 V dc mid trip circuit breaker
P7000246	40 A mid trip circuit breaker kit*
A0722722	45 A 80 V dc mid trip circuit breaker
A0722726	50 A 80 V dc mid trip circuit breaker
P7000247	50 A mid trip circuit breaker kit*
A0722727	60 A 80 V dc mid trip circuit breaker
P7000251	60 A mid trip circuit breaker kit*
A0722497	65 A 80 V dc mid trip circuit breaker
A0722732	70 A 80 V dc mid trip circuit breaker
P0941248	70 A mid trip circuit breaker kit*
A0722733	80 A 80 V dc mid trip circuit breaker
P0941249	80 A mid trip circuit breaker kit*
A0722750	90 A 80 V dc mid trip circuit breaker
A0722496	100 A 80 V dc mid trip circuit breaker
P0941250	100 A mid trip circuit breaker kit*
A0841413	150 A 80 V dc mid trip circuit breaker, double position
P0941251	150 A mid trip circuit breaker kit*
P7000249	1 A to 60 A 80 V dc bullet-type fuse holder, single position
P0987658	70 A to 100 A 80 V dc bullet-type fuse holder, double
A0601322	1 A TPS fuse
A0601323	3 A TPS fuse
A0601325	5 A TPS fuse
A0601326	6 A TPS fuse
A0601327	10 A TPS fuse
A0601328	15 A TPS fuse
A0601329	20 A TPS fuse
A0601330	25 A TPS fuse
A0601331	30 A TPS fuse
A0601332	40 A TPS fuse
-continued-	

Ordering Number	Description
A0601333	50 A TPS fuse
A0601334	60 A TPS fuse
A0601335	70 A TPS fuse
A0877938	100 A TLS fuse
A0810033	10-position fuse kit
A0888679	0.180 A fuse
A0888681	0.250 A fuse
A0888682	0.500 A fuse
A0888683	0.650 A fuse
A0888684	0.750 A fuse
A0888685	1 A fuse
A0885525	1.33 A fuse
A0885527	1.50 A fuse
A0885529	2 A fuse
A0885530	3 A fuse
A0885531	5 A fuse
A0888686	7.5 A fuse
A0885532	10 A fuse

* A circuit breaker kit includes the required load clip.

Table 8.5 – Miscellaneous equipment

Ordering number	Description
P7000270	Temperature sensor with 3-meter cable
P7000198	8-position battery connection kit
P7000196	Front access AC connection kit

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List of terms

A	ampere
AC or ac	alternating current
ACTIV	activate
Ah	ampere hour
Amb	ambient
APPL	apply
AWG	American Wire Gauging
BAT or Batt	battery
BAT RTN	battery return
BLVD	battery low voltage disconnect
BOD	battery on discharge
BR	battery return
BRR	battery return reference
Btu	British thermal unit
CAN (protocol)	Controller Area Network
°C	degree Celsius
C	common
CHNG	change
cm	centimeter
COMP	compensation
DC or dc	direct current
EEM (protocol)	Emerson Energy Master
EES	Emerson Energy Systems
ESD	Electrostatic discharge
°F	degree Fahrenheit
F	fuse
FA	fuse alarm
GRD or GRND	ground
GSM	Global Satellite Mobile (system)

GUI	graphical user interface
h or hr	hour
HIST	history
HV	high voltage
HVSD	high voltage shutdown
Hz	hertz
IM	installation manual
INFO	information
in.	inch
INHIB	inhibit
I/O	input/output
ISG	isolated system ground
kg	kilo
kW	kilowatt
kWh	kilowatt/hour
LAN	local area network
lb	pound(s)
LCD	liquid crystal display
LED	light emitting diode
LLVD	load low voltage disconnect
LV	low voltage
LVD	low voltage disconnect
maint	maintenance
MHz	Megahertz
min	minute(s)
MJ	major
mm	millimeter
MN	minor
mV	millivolt
NA	North American
NC	normally closed
NO	normally open
PC	personal computer
PPP	Point to Point Protocol
PSTN	Public Switched Telephone Network
sec	second(s)
SET	settings
SNMP	Simple Network Management Protocol
SP	small power
SPG	single point ground (connection)

STAT	status
SYST	system
TB	terminal block
TBD	to be determined
TC	temperature compensation
TCP/IP	Transmission Control Protocol/Internet Protocol
TEMP	temperature
THD	total harmonic distortion
UL	Underwriters Laboratories
UM	user manual
V	volt
VRLA	valve regulated lead acid
W	watt
WAN	wide area network

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Technical service assistance

For technical assistance, 24 hours / 7 days a week, dial (972) 367- 4598 (direct access) or one of the following toll-free numbers. This service complements the services offered by field support organizations such as Emergency Technical Assistance Service (ETAS) and Installation Technical Assistance Service (ITAS).

In the U.S.A.: 1-800-992-8417

In Canada: 1-800-363-2288

Candeo *SP* 48300 Power System AP6C55AA User Manual

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