UNIPOWER

Powering Technology

OPERATING MANUAL
UNIPOWER TELECOM POWER
CONTROL & MONITOR SYSTEM
DSC1000 SERIES

www.unipowerco.com

Manual No. DSC1000-7

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FIGURES

1.0 INTRODUCTION

The Gravitas DSC1000 is a remote access system controller for telecom power systems. It is used to digitally control and monitor a communications center/site power system. In particular it can be employed with UNIPOWER's Sigma, Radian, Ranger, auro-he and BLUEstreak Series rectifiers. Embedded versions of the DSC1000 are also used in UNIPOWER's X75, X100, X200 & X300 Compact DC Power Systems.

The DSC1000 is only 1U high and features local or remote control and monitoring of 12, 24 or 48-volt power systems. Communication is over an Ethernet connection or SNMP (Simple Network Management Protocol). The unit can control and supervise up to 64 rectifiers in 16 shelves. The front panel has an LCD matrix display, 16 LED indicators and an 8-key touchpad. The controller can be programmed via the touchpad and 16-character, 2-line matrix display or by means of a PC web page display. Other features include up to 8 Form C relay alarms, battery temperature compensation, up to 8 digital inputs for monitoring, and control of 2 low voltage disconnects.

The rectifiers are controlled via I2C data over a common 4-conductor telephone cable with RJ11 connectors. A large number of system operating parameters are measured or monitored by the DSC1000. The units are shipped with default settings for 12, 24 or 48-volt operation.

Figure 1 - DSC1000 Power Control & Monitoring System

2.0   FEATURES & ACCESSORIES

2.1   Standard Features

- ◆   Controls up to 64 Rectifiers
- ◆   Controls LV Disconnects
- ◆   Local or Remote Control & Monitoring
- ◆   Ethernet Communications with SNMP
- ◆   12, 24 or 48VDC Operation
- ◆   I²C Rectifier Monitoring & Control
- ◆   Front Panel or Web-Based Programming
- ◆   16-Character, 2-line LCD Display
- ◆   8-Key Touchpad Control
- ◆   16 LED Indicators
- ◆   Up to 8 Form C Relay Alarms
- ◆   Battery Temperature Compensation

2.2   Accessories

- ◆   Various Probes for External Temperature Measurement
- ◆   I²C Adaptor for connection to rectifier shelves

3.0   SAFETY WARNINGS

3.1   The DSC1000 operates in a system environment where voltages could be potentially be hazardous. Furthermore, inadvertent short circuiting of the system battery and/or rectifier by mis-connection or other error could be harmful. This product should be handled, tested and installed only by qualified technical persons who are trained in the use of power systems and are well aware of the hazards involved.

3.2   When operating the DSC1000 the chassis ground terminal must be connected to the system frame ground or other proper safety ground for the protection of personnel.

3.3   All connections to the DSC1000 should be carefully checked for errors before applying power to it.

3.4   This equipment is intended only for installation in a "RESTRICTED ACCESS LOCATION".

4.0   WARRANTY (summary)

DSC1000 is warranted for two (2) years from date of shipment against defects in material and workmanship. This warranty does not extend to products which have been opened, altered or repaired by persons other than persons authorized by the manufacturer or to products which become defective due to acts of God, negligence or the failure of customer to fully follow instructions with respect to installation, application or maintenance.

For a complete text of UNIPOWER's warranty conditions please request a copy from your local Sales Office.

5.0   UNPACKING AND INSPECTION

5.1   This unit was carefully tested, inspected and packaged for shipment from our factory. Upon receipt the unit should be carefully unpacked and inspected for any damage in shipment.

5.2   If there is evidence of damage, **<u>do not attempt to install the unit</u>**. The freight carrier should be notified immediately and a claim for the cost of the unit should be filed with the carrier for direct reimbursement. Be sure to include the model and serial number of the damaged unit in all correspondence with the freight carrier. Also save the shipping carton and packing material as evidence of damage for the freight carrier's inspection.

5.3   UNIPOWER will cooperate fully in case of any shipping damage investigation.

5.4   Always save the packing materials for later use in shipping the unit. Never ship the system or the rectifier modules without proper packing.

6.0   GENERAL SPECIFICATIONS

The DSC1000 is designed to be operated with power system of both positive and negative polarity. Specifics relating to this capability are covered under the appropriate sections elsewhere in this manual.

6.1   Inputs

Supply Voltage:	18 – 72VDC (24 & 48V models)
	10 – 15VDC (12V model)
Supply Current:	0.4A max + LVD Coil Drive currents
	(24 & 48V models)
	1.0A max + LVD Coil Drive currents (12V model)
Voltage measurement:	0 – 80VDC
Current measurements:	0 – 50mV (from suitably scaled shunt)
LVD Sense:	Volts free contact input*
Fuse/Breaker Sense:	Volts free contact input*
Aux 3 to Aux 8 inputs:	Volts free contact input*

*Volts free contacts are internally pulled up to 5V with reference to rectifier negative sense, these lines should not be tied to anything other than volts free contacts or floating opto-coupler outputs.

Temperature probes:	Sensor with output current proportional to temperature.

6.2   Outputs

LVD1 & 2 coil drives:	1A max at supply voltage level.
Alarm Relay Contacts:	Form C, 1A max at 30VDC.
DIGITAL I/O:	
I²C Rectifier Interfaces:	5V level I²C referenced to rectifier negative sense.
Ethernet:	10/100 Base T

6.3   Protection

Supply Input: Internal fuses on positive and negative lines.
                               Reverse Polarity Protected by internal series diode.

Voltage Sense Input: Internally fused.

Current Sense Inputs: Internally protected by automatic resettable fuses.

LVD Coil drives: Internal fuses on positive and negative lines.

Note: None of the fuses are user replaceable.

6.4   SAFETY

The DSC1000 operates entirely at SELV voltages and is compliant with UL60950-1 2nd Edition, EN60950-1 2nd Edition, CSA22.2-60950 2nd Edition and all other derivatives of the core IEC60950-1 2nd Edition standard when installed correctly as a component part of a Telecom Power System.

6.5   EMC

The DSC1000 complies with the following Norms when correctly installed as a component part of a Telecom Power System.

Conducted Emissions: EN55022, level B

Radiated Emissions: EN55022, level B

ESD: EN61000-4-2, level 4, criterion A - 8kV contact,
                               15kV air.

Radiated Immunity: EN61000-4-3, level 3, criterion A - 10V/m.

Surges (power ports):   EN61000-4-5, level 1, criterion A - 500V

6.6   Environmental

Operating Temperature: -20°C to 50°C

Storage Temperature: -40°C to 75°C

Humidity: 0% to 95% Non-Condensing

6.6   Physical Specification

Case Material: Steel

Finish: Clear Passivated

Dimensions: 1.75H (44.5) x 17.2W(437) x 8.1D(205)
Inches (mm)

Rack Width: 19" or 23" using dual purpose kit supplied.
                            NOTE: Mid-mount is recommended when used in
                            free space.

7.0   REGULATORY

7.1   The DSC1000 operates entirely at SELV voltages and is compliant with UL60950-1, EN60950-1, CSA22.2-60950 and all other derivatives of the core IEC60950-1 standard when installed correctly as a component part of a Telecom Power System.

7.2   The DSC1000 is CE marked to indicate conformance to the European Union's Low Voltage and EMC Directive.

8.0   FRONT PANEL DESCRIPTION

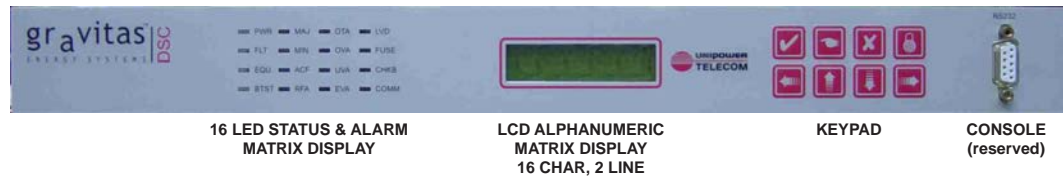| 16 LED STATUS & ALARM | LCD ALPHANUMERIC | KEYPAD | CONSOLE |
| MATRIX DISPLAY | MATRIX DISPLAY | | (reserved) |
| | 16 CHAR, 2 LINE | | |

Figure 2 - Front Panel

8.1   On the left side of the front panel are 16 LED indicators which display various status and alarm conditions. These are described in more detail in section 10.

8.2   At the centre of the panel is a 16 Character, 2 Line Alphanumeric LCD Display. This display provides information about a range of different system parameters and may also be used in conjunction with the keypad to the right to setup all system parameters other than the alarm matrix (discussed later) and the SNMP facility.

8.3   On the right side is the 8-Key control panel that is used in conjunction with the LCD Display to the left in order to set and display all systems parameters with the exception of the alarm matrix and the SNMP facility.

Notes: The primary means of setting up the DSC1000 unit is via it's built-in WEB server, which is accessed using a WEB browser via the Ethernet TCP/IP connection.

The RS232 Connector mounted at the right side of the front panel is provided for UNIPOWER use only as a CONSOLE port.

9.0 REAR PANEL DESCRIPTION

ETHERNET
CONNECTION
(RJ45)

EXTERNAL SYSTEM
CONNECTIONS
(Spring Clamp Terminals)

FORM-C ALARM
RELAY CONNECTIONS
(D-25 Connector)

RECTIFIER SHELF (I²C) CONNECTIONS
(RJ11)

Figure 3 - Rear Panel

9.1   On the left hand side, viewed from the rear, is the Ethernet TCP/IP connection (J2). This connection uses a standard RJ45 Network connector. It is used to connect either to a Local Area Network or directly to a PC with network connection, the latter using a standard cross-over cable.

9.2   Immediately to the right of the Ethernet connection is a bank of 36 Spring Clamp Terminals (J3, J4 & J5). These terminals take inputs from the power bus voltage, rectifier and load current shunts, battery and external temperature sensors, LVD contact sensors, fuse/breakers sensors and up to 5 more contact sensors which may be used for any general plant parameter.

9.3   Two LVD coil outputs driving up to 1A maximum are also provided along with the unit's DC supply input connections. Typically one LVD coil would be used for 'Load Shedding' early on in the battery discharge state while the other is used to disconnect the batteries before a 'fatal' deep discharge point is reached.

9.4   In the centre is a 25-way Sub-miniature D-Type connector which carries up to 8 form-C (changeover) dry contact relay alarm outputs. Two of these are dedicated as Major (Immediate Response) and Minor (Scheduled Response) alarms whilst the remaining 2 or 6 ('F' configuration) may be used for a variety of alarm conditions as programmed via the Alarm Configuration WEB page.

9.5   To the right side are 4 or 8 ('F' configuration) RJ11 telephone style connectors. These are used to connect to the UNIPOWER rectifier shelves. Each jack connects to one individual shelf via an adaptor module which is plugged into the rear of the standard shelf. The module allows for one additional shelf to be slaved from the first, thus enabling the controller to support up to 8 or 16 ('F' configuration) shelves with a maximum of 4 rectifiers per 23" shelf or 3 rectifiers per 19" shelf. This highly flexible configuration approach enables the DSC1000 to control and monitor a maximum of 32 or 64 ('F' configuration) rectifier modules.

Note: It is necessary to order the I²C enabled version (-Z option) of the Sigma, Radian or Ranger shelves when connecting to the DSC1000 with the adaptor. See Appendix 2 on page 53.
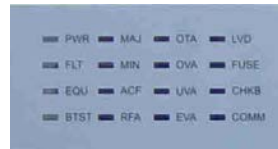
10.0   LED Indicators

Figure 4 - LED Indicators

The LED indicators provide visual indication of both status and alarm conditions as described below:

PWR – GREEN – Indicates that the unit has power.
FLT – GREEN – Indicates that the unit is in 'Float' mode.
EQU – YELLOW – Indicated that the unit is in 'Equalisation' mode.
BTST – YELLOW – Indicates that a battery test is in progress.
MAJ – RED – Indicates a 'Major' (Immediate Response) alarm condition.
MIN – RED – Indicates a 'Minor' (Scheduled response) alarm condition.
ACF – RED – Indicates an AC supply failure.
RFA – RED – Indicates a Rectifier module failure.
OTA – RED – Indicates that the one or more of the monitored temperatures is too high.
OVA – RED – Indicated that the system Bus Voltage is too high.
UVA – RED – Indicates that the system Bus Voltage is too low.
EVA – RED – Indicates that the system Bus Voltage is nearing the point at which the battery
          LVD will be opened.
LVD – RED – Indicated that at least one of the two LVD contactors is open.
FUSE – RED – Indicates that a monitored fuse or breaker is open.
CHKB – RED – Indicates that there is a battery fault.
COMM – RED – Indicates an I²C communications failure.

11.0   LCD ALPHANUMERIC DISPLAY

The 16 character, 2 line LCD alphanumeric display provides a menu structure in conjunction with the keypad enabling the status of a range of system parameters to be displayed and programmed.

During normal operation the system Bus Voltage and Rectifier Current will be displayed:
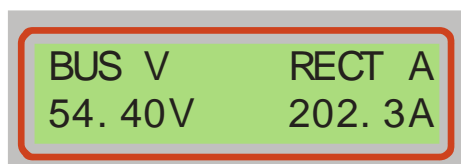

Figure 5 - Default Display Condition

The complete menu structure for displaying and programming system parameters is discussed later in section 16.

12.0 KEYPAD

The keypad is used in conjunction with the alphanumeric LCD display to navigate through the menu structure and to set system parameters as required.
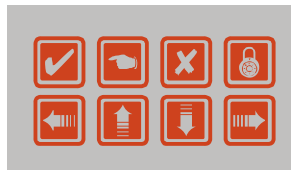

Figure 6 - Keypad

A brief description of the function of each key follows:

Key	Function
	When the system is in normal display mode this key will present a password entry screen. At any other time pressing this key will return the system to normal display mode.
	Used to confirm entry of a new setting once it has been set on the display.
	Used to cancel the last entry. Pressing this key several times will return the display to the top STATUS menu.
	Used to enter the displayed menu or parameter setup.
	Used to navigate up and down through the menus and to scroll through the alphabet or numbers when programming a parameter.
	Used to select the next or previous character or digit when programming a parameter.

Table 1 - Keypad Button Description

13.0   DESCRIPTION OF OPERATION

13.1   The DSC1000 controls and monitors up to 16 rectifier shelves containing up to four rectifiers each. This is accomplished by means of the eight connectors J7 through J14 which connect directly to eight rectifier shelves and from there through a shelf adaptor module to a second 'slave' shelf in each case. Through these connections the DSC1000 controls the rectifier output voltage which is preset by float voltage and equalize voltage settings programmed into the unit. Further fine voltage control is provided through a set of temperature compensation settings appropriate to the batteries being employed with the system.

Through the I²C interface that is employed to communicate with the rectifiers the DSC1000 also monitors a number of other rectifier parameters including AC OK, DC OK, Temperature Alarm, Fan OK and Internal Temperature.

Inventory information stored on an EPROM in the rectifier module including Model No., Serial No., Part No., Revision No., Country of Manufacture and Name of Manufacturer is also available and displayed of the 'Rectifier Status' WEB page when the unit is interrogated using a WEB browser.

13.2   The DSC1000 also monitors a number of other system parameters including Bus Voltage, Rectifier Current, Battery Current, Load Current, Battery Temperature, External Temperature, Internal Temperature, LVD Status and Fuse/Breaker Status.

The unit also has up to 6 further undedicated contact closure inputs which may be used to monitor various other external conditions.

13.3   The DSC1000 provides up to 8 Form-C relay alarm outputs. Two of these are dedicated to 'Major' (Immediate Response) and 'Minor' (Scheduled Response) alarms while the other 6 may be programmed to provide alarms for various fault conditions.

IMPORTANT NOTE: When a power system controlled by the DSC1000 is first powered up, you will notice that the bus voltage is not at the level as set by the float voltage setting. This is completely normal. The bus voltage will slowly be increased over around 15 minutes until the final float voltage is reached.

This 'walk-in' feature is designed to keep control of the battery charge current within the current limit setting and to minimise stress on system components.

To disable this feature it is necessary to change the appropriate setting via the WEB interface.
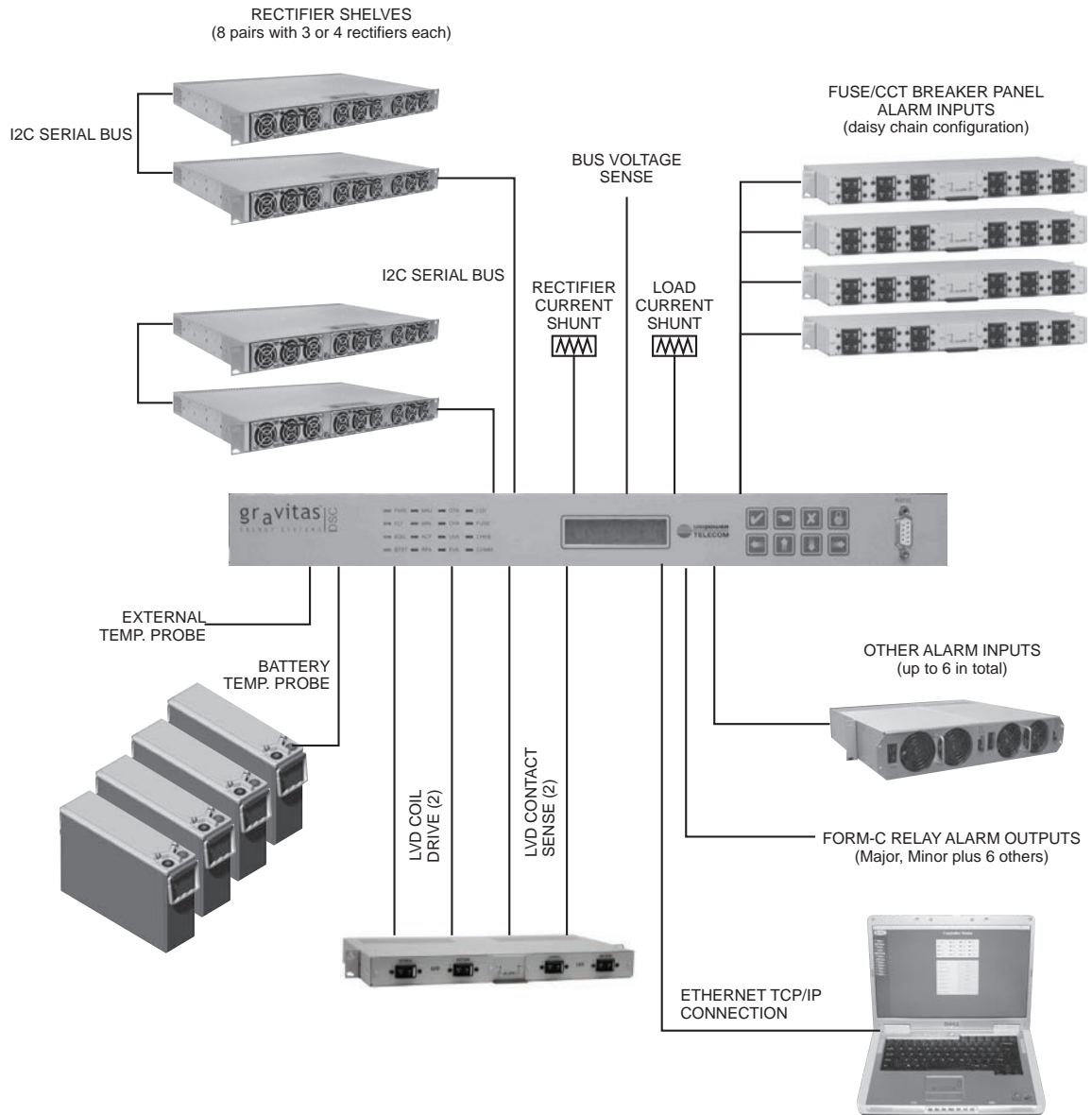
Figure 7 - DSC1000 Functions

14.0   MAKING CONNECTIONS TO THE DSC1000

14.1   Rectifier Shelf Connections

Connection to the rectifier shelves is made through the J7 thru J14 receptacles, which are standard RJ11 'telephone' jacks. At the rectifier shelf end of these connections is an identical RJ11 jack mounted on the I²C shelf adaptor module, thus any standard 'telephone' cable of appropriate length may be used to make this connection. Adaptor modules are available for UNIPOWER rectifier shelves matching with the SIGMA, RADIAN, AURO-HE, BLUEstreak and RANGER families of rectifiers and must be ordered separately.

J7 - J14 CONNECTIONS			
Pin	Function	Pin	Function
1	Not Used	4	+5V I²C Supply
2	SDA – Serial Data	5	SCL – Serial Clock
3	Signal GND (SENSE-)	6	Not Used

Figure 8 - Rectifier Shelf Connector Pin-Out

14.2   General System Input / Output Connections

With the exception of the rectifier, Form-C Alarm Relay and Ethernet Connections all system connections are made via 3 blocks of spring clip terminals.

These terminals accept wire sizes in the range #28 to #20 AWG.

J3 CONNECTIONS		J4 CONNECTIONS		J5 CONNECTIONS	
Term.	Function	Term.	Function	Term.	Function
1	PWR+, Supply Positive	1	BATT TEMP. PROBE +	1	CONTACT#4 SENSE
2	PWR-, Supply Return	2	BATT TEMP. PROBE -	2	CONTACT#4 RETURN
3	LVD1 COIL DRIVE	3	EXT. TEMP. PROBE +	3	CONTACT#5 SENSE
4	LVD1 COIL RETURN	4	EXT. TEMP. PROBE -	4	CONTACT#5 RETURN
5	LVD2 COIL DRIVE	5	Not Used	5	CONTACT#6 SENSE
6	LVD2 COIL RETURN	6	Not Used	6	CONTACT#6 RETURN
7	BUS V SENSE +	7	LVD CONTACT SENSE	7	CONTACT#7 SENSE
8	BUS V SENSE -	8	LVD CONTACT SENSE	8	CONTACT#7 RETURN
9	RECT. SHUNT +	9	FUSE SENSE	9	CONTACT#8 SENSE
10	RECT. SHUNT -	10	FUSE SENSE RETURN	10	CONTACT#8 RETURN
11	LOAD SHUNT +	11	CONTACT#3 SENSE	11	Not Used
12	LOAD SHUNT -	12	CONTACT#3 RETURN	12	Not Used

Note: J4 pins 7 thru 12 and J5 pins 1 thru 10 are for volt free contact inputs only.

Figure 9 - General System I/O Terminal Connection

14.3   Alarm Relay Connections

Connection to the Form-C alarm relay outputs is made through a 25-pin subminiature D connector J6. There are a total of 4 or 8 ('F' configuration) relay outputs with Normally Open, Normally Closed and Common Contacts available for connection. The individual relays contact sets are fully isolated and may be floated from GROUND by up to 100V. Maximum contact current and voltage are 1A and 30V (DC or AC) respectively.

J6 CONNECTIONS			
Pin	Function	Pin	Function
1	MAJ. ALARM – COM.	14	MAJ. ALARM – N/C
2	MAJ. ALARM – N/O	15	MIN. ALARM – COM.
3	MIN. ALARM – N/C	16	MIN. ALARM – N/O
4	K3 ALARM – COM.	17	K3 ALARM – N/C
5	K3 ALARM – N/O	18	K4 ALARM – COM.
6	K4 ALARM – N/C	19	K4 ALARM – N/O
7	K5 ALARM – COM.	20	K5 ALARM – N/C
8	K5 ALARM – N/O	21	K6 ALARM – COM.
9	K6 ALARM – N/C	22	K6 ALARM – N/O
10	K7 ALARM – COM.	23	K7 ALARM – N/C
11	K7 ALARM – N/O	24	K8 ALARM – COM.
12	K8 ALARM – N/C	25	K8 ALARM – N/O

Note: Pin 13 is not used.

Figure 10 - Alarm Relay Connector Pin-Out

14.4   Ethernet Connection

The DSC1000 is connected to a TCP/IP LAN (Local Area Network) or directly to a PC using the J2 receptacle. This is a standard RJ45 network connector allowing connection of any generally available Ethernet cable. Note that if the DCS1000 is to be connected directly to a PC rather than a LAN then a cross-over Ethernet cable will be required.

J2 CONNECTIONS			
Pin	Function	Pin	Function
1	TX +	5	Not Used
2	TX -	6	RX -
3	RX +	7	Not Used
4	Not Used	8	Not Used

Figure 11 - Ethernet Connector Pin-Out

14.5   Additional expansion connectors

The DSC1000 may be supplied with one or more of the following additional connectors fitted as optional extras.

14.5.1 Rectifier Expansion Connection J15
This connection provides for connection of an external rectifier shelf multiplexer which can support an additional 16 shelves (8 master, 8 slave) increasing the total maximum supported number of rectifiers to 128.

14.5.2 I²C Accessories J16
This connection allows for connection of a number of I²C based accessories such as single or 3-phase AC monitor modules.

Consult UNIPOWER Sales for a list of available accessories.

15.0 INSTALLING AND CONNECTING UP THE DSC1000

The DSC1000 can be mounted in either 19" or 23" racks by using the supplied brackets. Mount it from the front of the rack using the correct offsets to align with existing rack-mounted equipment. Once mounted in the rack the following connections must be made with the unit switched off.

15.1 DSC1000 Power Input

The DSC1000 is available for use with 12V, 24V or 48V power systems. The input supply range for 12V models is 10-15VDC and for 24V/48V models is 18-72VDC.

Power is connected to the DSC1000 using two terminals on the Spring Terminal Block J3. The supply cables connected to these terminals are best terminated directly to the system bus bars at the point where the Rectifier, Battery and Load feeds are connected.

For a standard system configuration the DSC1000 is powered directly from the main system bus and will continue to function during both normal operation and an AC power outage under battery operation. In such circumstance when the batteries reach a fully discharged state and the Battery LVD is opened the DSC1000 will be switched off along with all equipment powered from the system. This ensures that even the very small current drawn by the DSC1000 does not continue to drain the batteries and reduces the risk of damage to the battery cells due to deep discharge.

In some circumstances it may be desirable to connect the DSC1000 to the battery side of the LVD in order to maintain functionality and remote communications access. This configuration is NOT RECOMMENDED for the reasons given above. In such circumstances it is recommended that the DSC1000 is supplied from a separate DC power supply with or without battery back-up as required.

CAUTION: When connecting these inputs double check to make sure that they are connected with the appropriate polarity for the system.

For a Positive Earth System the PWR + input must be connected to the +V (GND) and the PWR – input must be connected to the –V (FEED). This is the appropriate connection for a -48V Telecom Power Plant.

For a Negative Earth System the PWR – input must be connected to the –V (GND) and the PWR + input must be connected to the +V (FEED). This is the appropriate connection for a +12V or +24V Telecom Power Plant.

15.2 System Bus Voltage

This is measured directly by the DSC1000 using two terminals on the Spring Terminal Block J3. The voltage sense cables connected to these terminals are best terminated directly to the system bus bars at the point where the Rectifier, Battery and Load feeds are connected.

CAUTION: When connecting these inputs double check to make sure that they are connected with the appropriate polarity for the system.

For a Positive Earth System the BUS V SENSE + input must be connected to the +V (GND) and the BUS V SENSE – input must be connected to the –V (FEED). This is the appropriate connection for a -48V Telecom Power Plant.

For a Negative Earth System the BUS V SENSE – input must be connected to the –V (GND) and the BUS V SENSE + input must be connected to the +V (FEED). This is the appropriate connection for a +12V or +24V Telecom Power Plant.

IMPORTANT – Do NOT use the same pair of cables for the Power Input and Bus Voltage Sense functions as there is a risk that under certain conditions of system failure severe damage might occur. In circumstances where it is determined that the connections have been combined the warranty will be void.

15.3 System Rectifier Current and System Load Current

The DSC1000 measures System Rectifier Current and System Load Current using two shunts and from these two measurements calculates the Battery Charge/Discharge Current.

The System Rectifier Current shunt is connected to the DSC1000 via the spring clip terminals J3-9 and J3-10 while the System Load Current shunt is connected via the spring clip terminals J3-11 and J3-12.

Figure 12 shows how the shunts should be connected into the system and to the DSC1000.
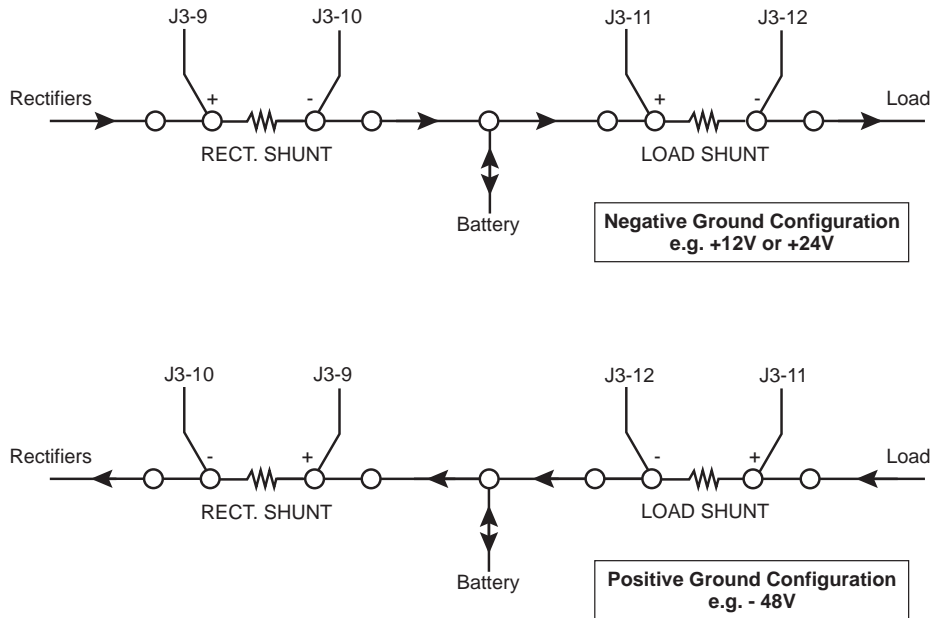
J3-9   J3-10   J3-11   J3-12

Rectifiers ───►──○──○──+──WWW──-──○──○──►──○──►──○──+──WWW──-──○──○──►── Load

RECT. SHUNT   LOAD SHUNT

Battery

Negative Ground Configuration
e.g. +12V or +24V

J3-10   J3-9   J3-12   J3-11

Rectifiers ───◄──○──○──-──WWW──+──○──○──◄──○──◄──○──-──WWW──+──○──○──◄── Load

RECT. SHUNT   LOAD SHUNT

Battery

Positive Ground Configuration
e.g. - 48V

Figure 12 - Current Shunt Connections

CAUTION: In the case of Positive Ground configuration (e.g. -48V) the shunts must be connected in the Positive (GND) path for correct operation.

The DSC1000 can be programmed to operate with any standard shunt appropriate to the total capacity of the system that provides a full scale output of 50mV.

Consult UNIPOWER Technical Support for recommended shunts for your application.

15.4   Rectifier Shelf Connections

Rectifier shelves are connected to the DSC1000 using the I²C Serial Bus connections J7 to J14. These connections utilize a 'telephone' standard RJ11 socket at both the controller and the rectifier shelf end. The rectifier shelf is connected by means of a rectifier shelf I²C adaptor which is plugged into the 25-way D connector on the rear of the shelf. The correct adaptor for the shelf in use must be ordered separately along with the shelf.

Each shelf adaptor has two RJ11 connections as shown in figure 13 below. One connector is used to connect the shelf to the DSC1000 and the other is to allow connection to a second 'slave' shelf. Each of the J7 to J14 connections will support a 'master' shelf on its own or a 'master' shelf coupled with a 'slave' shelf. Thus, with configuration 'F' the DSC1000 will support up to 8 'master' shelves with up to 8 'slave' shelves whereas without support is limited to 4 'master' shelves coupled with 4 'slave' shelves.
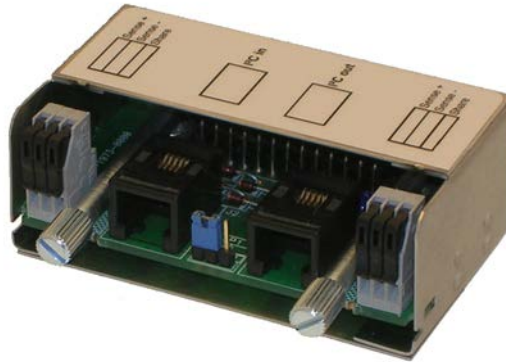
Figure 13 – Typical Rectifier Shelf I²C Adaptor

CAUTION: Each rectifier shelf connection to the DSC1000 constitutes a separate I²C bus connection. In order to be sure of reliable performance the total length of cable must not exceed 2m, including the distance from the DSC1000 to the 'master' shelf as well as the distance from the 'master' shelf to the 'slave' shelf.

IMPORTANT: The above connections are the minimum that are required to operate the DSC1000.

See Appendix 2, page 53 for details of connecting to and configuring the Rectifier Shelf I²C Adaptors.

15.5 Temperature Probe Connections

Two semiconductor type temperature probes can be connected to the DSC1000. One probe is dedicated to measuring battery cell temperature and enables the DSC1000 to apply Battery Temperature Compensation by adjusting the rectifier output float voltage in accordance with the specification of the batteries being employed with the system. The other optional probe can be used to monitor the temperature of any parameter such as the local ambient temperature or the temperature inside the system cabinet. One probe with 2m cable is supplied as standard.

Connection of the battery temperature probe is made to the BATT. TEMP. PROBE + and BATT. TEMP. PROBE – connections J4-1 and J4-2 respectively.

Connection of the external temperature probe is made to the EXT. TEMP. PROBE + and EXT. TEMP. PROBE – connections J4-3 and J4-4 respectively.

The temperature probe wires are coloured RED for the +ve connection and BLACK for the –ve connection.

CAUTION: In case of temperature probe connections being reversed the DSC1000 will be unable to make any temperature measurements. However, no damage will occur.

15.6   LVD Coil Drive and Contact Sense Connections

The DSC1000 supports two LVD (Low Voltage Disconnect) contactors.

The most common system configurations employ a single LVD which is used to disconnect the battery at a predetermined discharge voltage that provides for the maximum of system standby autonomy without damage to the battery cells due to deep discharge. Typical battery LVD set voltages are given in figure 14 below:

Typical Battery LVD Set-Point		
Nominal Voltage	Float Voltage	LVD Set-Point
48VDC	54.4VDC	42.0VDC
24VDC	27.2VDC	21.0VDC
12VDC	13.6VDC	10.5VDC

Figure 14 - Typical Battery LVD Set-Points

The second LVD is typically employed for 'load shedding' when the system is in a battery standby condition. By switching off some of the equipment being powered from the system it is possible to extend the time available to continue running critical equipment before the voltage reaches the battery LVD level. A system employing both battery and 'load shedding' LVDs is shown in figure 15.

Both LVDs can be independently set to any desired switch-on and switch-off voltage via the front panel or WEB browser interface.

Connection to the LVD1 coil is made through spring clip terminals J3-3 and J3-4 while connection to the LVD2 coil is made through spring clip terminals J3-5 and J3-6. These outputs drive the LVD coils at the system voltage up to a maximum of 1A under normal operating conditions, thus holding the LVD contacts closed in the active state.

The LVD contact status is sensed through the LVD CONTACT SENSE input on spring clip terminals J4-7 and J4-8. This input will detect that an LVD contactor is open when it is open circuit. If both LVDs are employed then the contact sensors should be wired to this input in series or alternatively LVD2 may be wired to one of the spare contact inputs.

CAUTION: The DSC1000 is shipped with LVD1 deployed as the battery LVD. It is highly recommended that the LVD contactors employed in the system include contact sensors otherwise there is a risk that in the event of failure of the LVD contactors this will not be detected. Consult UNIPOWER Technical Support for recommended coils for your application.
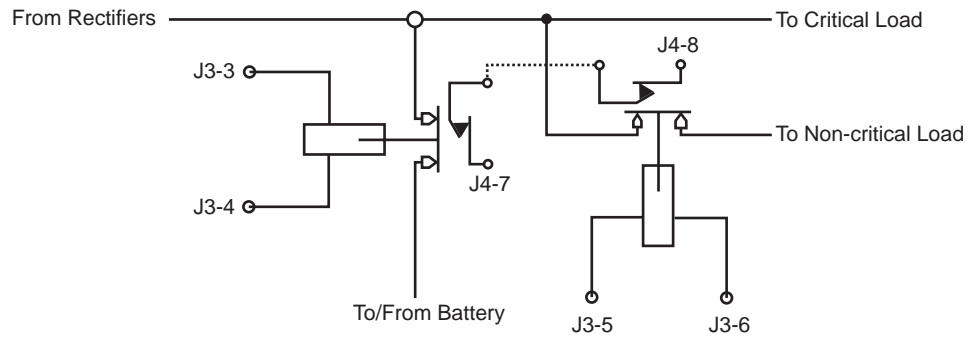

Figure 15 - Typical LVD Connection

15.7   Fuse/Circuit Breakers and Other Alarm Contact Inputs

The DSC1000 is provided with 4 or 8 ('F' option) volt free contact inputs which can be used to sense a variety of system status conditions. Two of these are pre-defined for Fuse/Circuit Breaker and LVD sense inputs respectively while those remaining may be used for any desired function; for example, detecting whether a cabinet door is open.

The Fuse/Circuit Breaker alarm sense input is provided on spring terminals J4-9 and J4-10. The remaining alarm sense inputs are provided on spring terminals J4-11&12, J5-1&2, J5-3&4, J5-5&6, J5-7&8 and J5-9&10.

For all the above alarm inputs a 'closed' condition is defined as OK while an 'open' condition is defined as ALARM. This default definition may be reversed through the Alarm Matrix Programming WEB page if so desired.

CAUTION: These alarm inputs are for VOLT FREE contact detection only.

16.0 ACCESSING SYSTEM STATUS AND PROGRAMMING VIA THE FRONT PANEL

The Front Panel Alphanumeric LCD display along with the keypad can be used to access all of the status and programming functions of the DSC1000 with the exception of the alarm matrix and optional SNMP, both of which are only accessible through the WEB server interface using a WEB browser.

A description of the complete menu structure starting from the normal operating display follows:

Note: There will be a slight delay between the time that a key is pressed and that time that the display is updated. This is due to the manner in which the microprocessor scans its peripheral devices in sequence.

16.1 Press ⬛ to access the level 1 passcode display `Enter Passcode 1` `000`

16.2 Using the ⬛⬛⬛⬛ keys dial in the level 1 passcode and press ✅ to confirm.

The level 1 passcode is factory set to '111'.
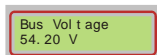
At this point you will have access to the top level menus.

To enter each menu press ⬛ and to exit press ❌.
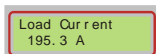
Press ⬛ at any time to return to the normal operating display.
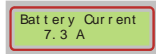
16.3 `Status` The status menu displays the following system parameters:

Press ⬛ or ⬛ to scroll through the status menu.

`Bus Voltage` `54.20 V`   Displays the system bus voltage.

`Rect. Current` `202.6 A`   Displays the total rectifier current.

`Load Current` `195.3 A`   Displays the total load current.
The DSC1000 utilises two system shunts to measure total rectifier current and total load current. Total load battery is then calculated using these two measurement.

`Battery Current` `7.3 A`   Displays the battery current.
A positive value indicates a charging current while a negative value indicates a discharge current, when the system is running on batteries.
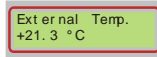
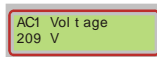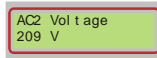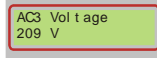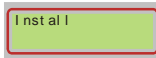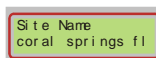|	
Battery Temp. +25.0 °C	Displays the battery temperature. Battery temperature is measured using a probe supplied with the DSC1000 that is attached to one of the battery terminals.
Controller Temp. +37.5 °C	Displays the DSC1000 control unit's internal temperature.
External Temp. +21.3 °C	Displays the temperature measured by an optional measurement probe. This probe would generally be installed in a location appropriate to obtain a measure of ambient temperature in the equipment room in which a power system is installed.
AC1 Voltage 209 V AC2 Voltage 209 V AC3 Voltage 209 V	Display the individual phase voltages of a 3-phase AC supply feed to the power system using an optional 3-phase measurement module. For a single phase application only the AC1 is used. Note: AC voltage monitoring is not presently available.
Time 24H 20:43:28 Date MM/DD/YYYY 01/01/2005	Displays the system date and time. The DSC1000 contains a real-time clock with its own internal battery supply. This clock can be synchronised with the real-time clock of any system connected through the WEB interface.
Number of rects. 12	Displays the number of rectifiers installed in the power system.
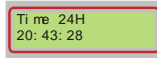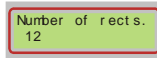
16.4   Install   The Install menu is used to set up the following parameters at the time of system installation:
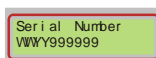
Press 🔼 or 🔽 to scroll through the Install menu.

Press ▶ enable the set-up cursor then use the 🔘🔼🔽▶ keys to dial in the required setting.

Press ✓ to confirm.

Site Name coral springs fl	Optional setting which may be used to identify the location of the unit.
Serial Number WWYY999999	Displays the unit serial number.

| Set Float V 54.40 | Sets the nominal float voltage in accordance with the specifications of the batteries that are being employed with the system. |

| Set Rect. Amps 0050 | Sets the 50mV full-scale rating for the shunt used to measure total rectifier current. |

| Set Load Amps 0150 | Sets the 50mV full-scale rating for the shunt used to measure total load current. |

| Set Equ. Volts 56.70 | Sets the equalisation voltage in accordance with the specifications of the batteries that are being employed with the system. |

| Set OVA Volts 59.00 | Sets the voltage at which the Over Voltage Alarm will trigger. This setting is determined by the maximum voltage that the load or the batteries will tolerate, whichever is the lowest. |

| Set UVA Volts 46.00 | Sets the voltage at which the Under Voltage Alarm will trigger. This setting is generally used to provide an early warning when the system is running on batteries that the charge level is getting low. |

| Set EVA Volts 43.00 | Sets the voltage at which the End Voltage Alarm will trigger. This setting provides a warning when the system is running on batteries that the charge level is close to the minimum safe level. |

| Set LVD1 Off 46.0 / Set LVD2 Off 42.0 | Set the voltages at which the LVD1 and LVD2 contacts will be opened as the battery voltage falls during a discharge cycle. |

| Set LVD1 On 46.5 / Set LVD2 On 42.5 | Set the voltages at which the LVD1 and LVD2 contacts will be closed once the AC supply has been restored. |

| Set Batt. OTA 40.0 | Sets the temperature, as measured by the battery temperature probe, at which the Battery Over-Temperature Alarm will be triggered. |

| Set Ext. OTA 50.0 | Sets the temperature, as measured by the optional external temperature probe, at which the External Over-Temperature Alarm will be triggered. |

| Set Cont. OTA 70.0 | Sets the point at which the Controller Over-Temperature Alarm will be triggered. This should not be set above 70C as this is the maximum specified internal operating temperature of the unit. |

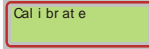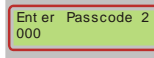|	
Set Temp. Comp. +00.0	Sets the temperature compensation slope in accordance with the specifications of the batteries that are being employed with the system.
Set TC Max Temp. 40.0	Sets the maximum allowable battery temperature in accordance with the specifications of the batteries that are being employed with the system. Above this temperature the compensation feature will cease to make adjustments to the float voltage.
Set TC Min Temp. +00.0	Sets the minimum allowable battery temperature in accordance with the specifications of the batteries that are being employed with the system. Below this temperature the compensation feature will cease to make adjustments to the float voltage.
Set # of cells 16	Sets the total number of battery cells that are being employed with the system.
Set Min # Rects. 005	Sets the minimum number of rectifiers that are required to provide sufficient load current combined with the battery recharge current required to recover from a fully discharged state within a predefined period.
Set Rect. Type RRS	Matches the DSC1000 with the characteristics of the rectifiers installed in the system.
Set Sys. Type 48	Sets the DSC1000 for use with a 48V, 24V or 12V system.
Set Time HH:MM 22:25	Sets the time in the internal real-time clock.
Set MM/DD/YYYY 01/01/2005	Sets the date in the internal real-time clock.
Set Equ. Time 001	Sets the time, in minutes, that the system will remain in equalization mode after the equalize mode has been set.
AC Mon. Present 3	Sets the type of AC monitor that is connected to the DSC1000. 3 = 3-phase, 1 = single phase, 0 = no monitor installed.
Set AC Ext. Min. 264	Sets the maximum allowable AC supply voltage on each phase.
Set AC Ext. Max. 085	Sets the minimum allowable AC supply voltage on each phase.

16.5 `Calibrate` The Calibrate menu is used to setup the following parameters which relate to matching the DSC1000 to the rectifiers, shunts and temperature probes.

In addition, the two access passcodes may be set from this menu.

The majority of these parameters are pre-set at the factory and should not require alteration.

Press ▣ to access the level 2 passcode display `Enter Passcode 2  000`

Using the ▣▣▣▣ keys dial in the level 2 passcode and press ☑ to confirm.

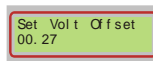The level 2 passcode is factory set to '123'.

Press ▣ or ▣ to scroll through the Calibrate menu.

Press ▣ enable the set-up cursor then use the ▣▣▣▣ keys to dial in the required setting.
Press ☑ to confirm.

`Set Volt Gain  388.89` — Sets the gain of the internal A/D measuring bus voltage.
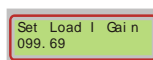
`Set Volt Offset  00.27` — Sets the offset of the internal A/D measuring bus voltage.

`Set Rect I Gain  099.40` — Sets the gain of the internal A/D measuring total rectifier current.

`Set Rect I Offst  -002.79` — Sets the offset of the internal A/D measuring total rectifier current.

`Set Load I Gain  099.69` — Sets the gain of the internal A/D measuring total load current.

`Set Load I Offst  -003.00` — Sets the offset of the internal A/D measuring total load current.

`Set B Tmp. Gain  0.01938` — Sets the gain of the internal A/D measuring battery temperature.
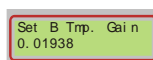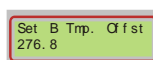
`Set B Tmp. Offst  276.8` — Sets the offset (in Kelvin) of the internal A/D measuring battery temperature.

| Set E Tmp. Gain
0.01938 | Sets the gain of the internal A/D measuring external temperature. |

| Set E Tmp. Ofst
277.0 | Sets the offset (in Kelvin) of the internal A/D measuring external temperature. |

| Set Setpoint 12V
13.5 | Sets the rectifier calibration point for 12V rectifiers. |

| Set Slope 12V
0.0168 | Sets the D/A slope characteristic for 12V rectifiers. |

| Set Setpoint 24V
27.1 | Sets the rectifier calibration point for 24V rectifiers. |

| Set Slope 24V
0.0336 | Sets the D/A slope characteristic for 24V rectifiers. |

| Set Setpoint 48V
54.3 | Sets the rectifier calibration point for 48V rectifiers. |

| Set Slope 48V
0.0672 | Sets the D/A slope characteristic for 48V rectifiers. |

| Set Passcode 1
000 | Sets the level 1 passcode to any value between 000 and 999. |

| Set Passcode 2
000 | Sets the level 2 passcode to any value between 000 and 999. |

16.6 `Function` The Function menu is used to set the system into either Float mode or Equalize mode.

Press 🔼 or 🔽 to select the desired function.

Press ☑ to confirm.
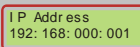
| Start Float | Sets the system into the normal float charge mode.
This is the default setting when the system is first switched on. |

| Start Equalize | Sets the system into equalize charge mode.
The system will automatically return to the default Float mode when the time set for equalization in the Install menu is reached or when the Start Float function above is reset. |

16.7 `Network Settings` The Network Settings menu is used to setup the various IP addresses required by the system to serve its WEB pages over the Ethernet TCP/IP connection.

Press ▣ or ▣ to scroll through the Network Settings menu.
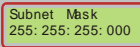
Press ▣ to enable the set-up cursor then use the ▣▣▣▣ keys to dial in the required setting.

Press ▣ to confirm.

`IP Address` `192:168:000:001`	Sets the unit's IP Address. The factory default is private address 192:168:000:200
`Subnet Mask` `255:255:255:000`	Sets the unit's IP Subnet Mask. The factory default is 255:255:255:0000
`Mail Host` `000:000:000:000`	Sets the IP address for the mail host which provides an SMTP relay for the unit to send alarm messages. The target email addresses are set using the Communications WEB page. The factory default is 000:000:000:000, not set.
`Gateway IP` `000:000:000:000`	Sets the IP address for a network gateway if required. The factory default is 000:000:000:000, not set.
`Email Transport` `Eth`	Sets the service that will be used to transfer emails when required. The factory default is 'unset'. If the email service is to be used then this must be set to 'Eth'.
`Mac Address` `88:88:88:88:88:8`	Displays the unique Mac Address identity of the Ethernet control IC installed in the DSC1000.
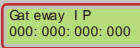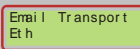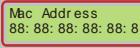
17.0   USING THE WEB BROWSER INTERFACE

The DSC1000 is provided with a built-in WEB server which can be accessed through the TCP/IP Ethernet port using a WEB browser. The WEB server employs Java Applets to continually scan system parameters and update the WEB page data. These same Applets return programming data to the DSC1000 when set-up changes need to be made.

The WEB server communicates with the browser using HTTP on IP Port 80 and the Java Applets on IP Port 8888. If any firewall or proxies are configured on the LAN that the DSC1000 is connected to it is important to ensure that these ports are open, otherwise the DSC1000 will not respond.

A genuine Java engine must be installed on the browser PC. The latest version can be downloaded and installed for free from www.java.com. Please note that installing only a browser plugin may not be sufficient for correct operation; so we recommend installing a full Java package.

If the installed version of Java is 7u45 or earlier the following procedure *"Setting up Java"* is not required for correct operation and cannot be implemented.

PLEASE NOTE THAT THE APPLETS WILL NOT WORK WITH JAVA VERSION 7u51. DO NOT INSTALLED THIS ON SYSTEMS USED TO MONITOR THE DSC1000.

WITH EFFECT FROM VERSION 7u60 THE FOLLOWING MUST BE IMPLEMENTED.

Setting up Java (7u60 or later only)

In order for the applets to be loaded correctly, you must add the IP address of the controller to the list of site exceptions in the java control panel. This can be found in the computer's control panel. Once the java control panel is open, select the Security tab as below.
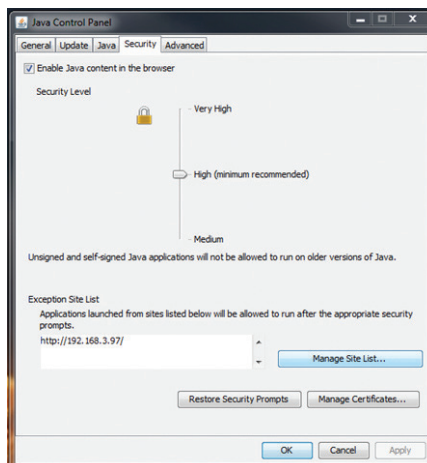
Ensure that 'Enable Java content in the browser' is checked and leave the "Security Level" set to "High (minimum recommended)"

Click on the Manage Site List button and the following will appear.
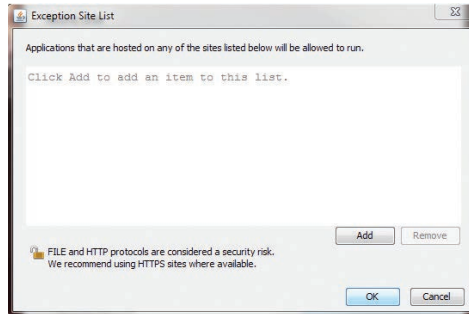
Click the Add button and type in the IP address of the controller in the format 'http://xxx.xxx.xxx.xxx' (substitute the IP address set in the controller). A warning will appear indicating that this is a security risk. Press Continue to allow the site to be added.
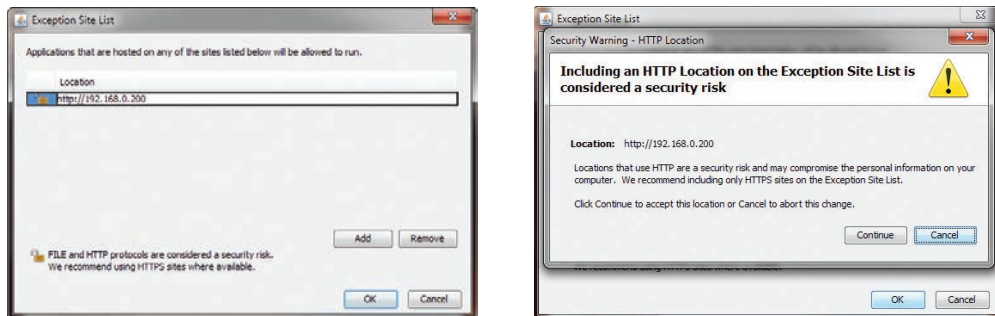
Now press OK and then OK again to close the Java control panel.

You should now be able to access the controller web pages and see the applets running.

Note that if you try to access a controller that has not been added to the exception list as above using a Browser with Java 7u60 or later installed you will get the following:
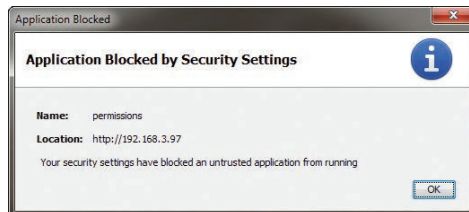
Note also that when accessing an allowed controller the following will appear at the start of each Browser session. Click OK to proceed. It will not appear again unless the Browser is closed and re-opened.
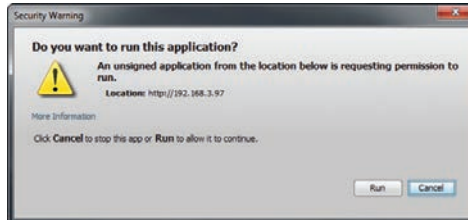
The DSC1000 has various network programming capabilities which allow it to be connected to almost any configuration of IP network.

The default network settings that the DSC1000 is shipped with are:

     IP Address   – 192.168.000.200
     Subnet Mask – 255.255.255.000
     Gateway   – 000.000.000.000

All pages served by the DSC1000 built-in WEB server consist of two frames; a 'navigation' frame on the left hand side and an 'information/programming' frame which occupies the majority of the browser window.

The buttons in the 'navigation' frame can be used at all times to jump between the various pages. Clicking on the UNIPOWER Telecom logo at the top will navigate directly to the UNIPOWER web site www.unipowerco.com.

Each of the blocks of information in the 'information/programming' frame is a Java applet. In some cases these applets simply collect information from the DSC1000 and presents it on-screen, in other cases the applets contain data entry fields for uploading programming information to the unit.

Note that a PC screen resolution of 1024 x 768 or higher is recommended to avoid excessive amounts of page scrolling.

The following sections describe the various WEB pages that can be viewed with the browser and give details of programming parameters that may be entered and sent to the unit.

17.1 Controller Status

When the DSC1000 is first accessed using a WEB browser the Controller Status page shown below is downloaded.
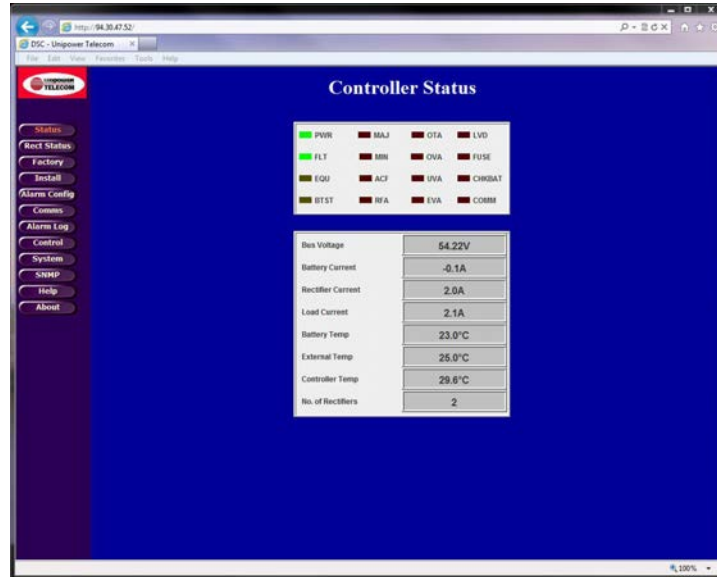
Figure 16 - Controller Status WEB Page

This page presents two blocks of information. The top block is a facsimile of the block of LED indicators on the front panel of the unit and gives a visual indication of the current status of the various LEDs. The bottom block of information shows the presents the following 'live' data:

Bus Voltage
Battery Current
Rectifier Current
Load Current
Battery Temperature
External Temperature
Controller Temperature
No. of Rectifiers Installed (includes all rectifiers that are present regardless of status)

If the battery or external temperature probes are not connected a reading of 25°C will be displayed by default.

17.2   Rectifier Status

The Rectifier Status page presents detailed information about an individual rectifier module. Two types of data are included; 'live' status information and 'static' inventory information. In addition the DCS1000 returns the I²C address as confirmation that the unit has responded.
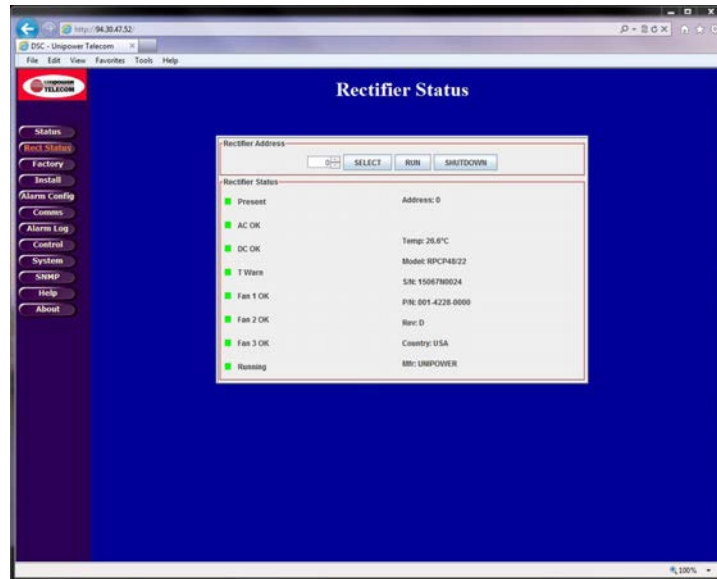
Figure 17 - Rectifier Status WEB Page

In order to obtain status information about a particular rectifier module it is necessary first to dial in the required rectifier address according to the table below and the click on the SELECT button to confirm the request.

RECTIFIER I²C ADDRESSING

Connector	LO Address Range	HI Address Range
J7	8 to 11	12 to 15
J8	16 to 19	20 to 23
J9	24 to 27	28 to 31
J10	32 to 35	36 to 39
J11	40 to 43	44 to 47
J12	48 to 51	52 to 55
J13	56 to 59	60 to 63
J14	64 to 67	68 to 71

Note: LO or HI range is determined by the jumper setting on the Rectifier Shelf I²C adaptor module.

Figure 18 - Rectifier I²C Addressing

A few seconds after the SELECT button has been pressed the DSC1000 will respond and the status and inventory information will be updated as follows:

'Live' data is presented in the form of 8 coloured indicator blocks to the left. A green block indicates a 'good' condition and a red block indicates a 'bad' condition. In addition the unit's internal temperature is presented on the right.

Note that not all rectifier models include fan monitoring facilities. When such rectifiers are installed the fan status indicator blocks will be greyed out.

'Inventory' data, presented on the right below the temperature measurement includes, among other items, rectifier model number Serial Number and Revision Number.

17.2.1 Rectifier Inhibit (Shutdown)

The DSC1000 includes a facility that enables the user to manually inhibit or shutdown individual rectifiers. This may be desirable when a particular rectifier is to be removed from the system for maintenance, although all UNIPOWER rectifiers are Hot-Swap, or for some other reason.

To inhibit a rectifier first dial in the I²C address of the required unit and the click on SHUTDOWN.

To restart a rectifier that has been inhibited dial in the I²C address of the required unit and the click on RUN.

Note that any rectifiers which have been inhibited will remain in this state until they are either restarted using the above method or the AC power is recycled.

17.3 Controller Factory Calibration

The primary purpose of the Controller Factory Calibration page is to allow UNIPOWER to setup a range of necessary calibration values to ensure correct operation.

When this page is requested and the Java applet has loaded a dialog requesting the Level 2 Passcode is presented. Once the passcode has been entered click ENTER and the page will then be updated with current values after a few seconds.
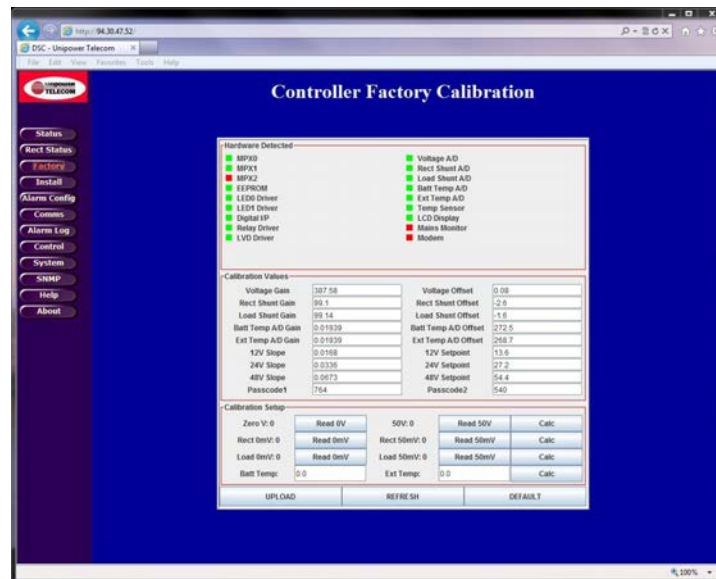
Figure 19 - Controller Factory Calibration WEB Page

17.4 Controller Site Installation

The Controller Site Installation page provides the system integrator or installer a user friendly alternative to the front panel display and keypad for setting up the main system parameters.
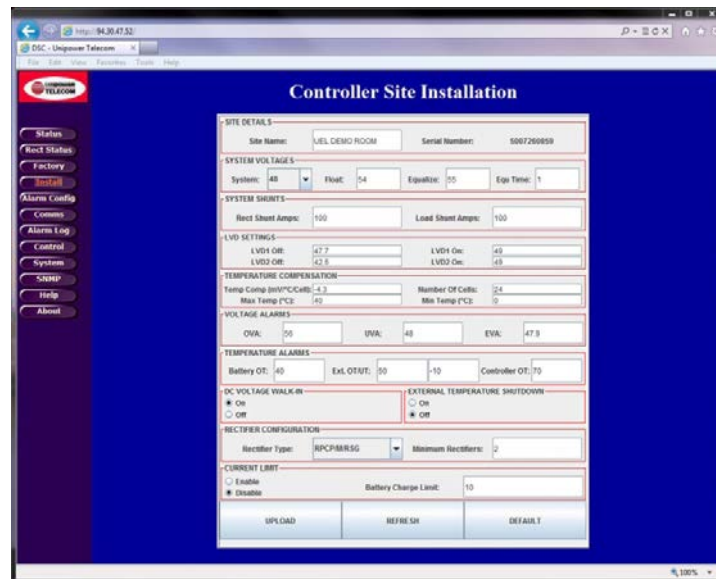
Figure 20 - Controller Site Installation WEB Page

To retrieve the currently programmed settings from the DSC1000 click on REFRESH. After a few seconds the values will be displayed.

To reprogram to the factory default settings click on DEFAULT. After a few seconds the default values will be displayed.

To setup this page for a new configuration type in or select each new entry required and press ENTER to confirm that entry. Once all required entries have been made click on UPLOAD. To confirm the new settings have been programmed into the DSC1000 click on REFRESH. Check the entries after a few seconds to make sure they are still as required.

Each setting that can be made on this page is described in detail as follows.

SITE DETAILS

Site Name – Optional setting which may be used to identify the location of the unit.

Serial Number – Displays the unit serial number. (Cannot be changed.)

SYSTEM VOLTAGES

System – Dial in the Nominal system voltage; 12V, 24V or 48V.

Float – Enter the float voltage in accordance with the specifications of the batteries that are being employed with the system.

Equalize – Enter the equalization voltage in accordance with the specifications of the batteries that are being employed with the system.

Equ Time – Enter the desired time that the system should remain in equalize mode in accordance with the specifications of the batteries that are being employed with the system.

SYSTEM SHUNTS

Rect Shunt Amps – Enter the 50mV Full-Scale rating for the shunt that is used to measure the total rectifier current.

Load Shunt Amps – Enter the 50mV Full-Scale rating for the shunt that is used to measure the total load current.

LVD SETTINGS

LVD1 Off – Enter the voltage at which the LVD1 contactor will open during a battery discharge.

LVD1 On – Enter the voltage at which the LVD1 contactor will re-connect once the rectifiers are running.

LVD2 Off – Enter the voltage at which the LVD2 contactor will open during a battery discharge.

LVD2 On – Enter the voltage at which the LVD2 contactor will re-connect once the rectifiers are running.

TEMPERATURE COMPENSATION

Temp Comp (mV/°C/Cell) – Enter the temperature compensation slope value in accordance with the specifications of the batteries that are being employed with the system.

Number Of Cells – Enter the total number of battery cells.

Max Temp (°C) – Enter the maximum temperature at which temperature compensation may be applied. Above this temperature the DSC1000 will cease to apply further compensation to the float voltage.

Min Temp (°C) – Enter the minimum temperature at which temperature compensation may be applied. Below this temperature the DSC1000 will cease to apply further compensation to the float voltage.

VOLTAGE ALARMS

OVA – Enter the voltage above which the Over-Voltage Alarm will be triggered.

UVA – Enter the voltage below which the Under-Voltage Alarm will be triggered.

EVA - Enter the voltage below which the End-Voltage Alarm will be triggered.

TEMPERATURE ALARMS

Battery OT – Enter the temperature at which the battery Over-Temperature alarm will be triggered.

External OT/UT – Enter the temperature at which the external Over-Temperature and Under-Temperature alarms will be triggered.

Controller OT – Enter the temperature at which the controller's internal Over-Temperature alarm will be triggered. THIS SETTING SHOULD NOT NORMALLY BE CHANGED.

DC WALK-IN

ON (Default) – Causes the controller to slowly ramp up the DC rectifier voltage when AC is applied. The voltage will rise from approximately 45V (for 48V systems), 22V (for 24V systems) and 11V (for 12V systems) up to the float voltage. The ramp-up time is several minutes and cannot be adjusted. The purpose of this feature is to avoid initially large battery charging currents.

OFF – Causes the controller to program all rectifiers to the float voltage almost immediately after AC is applied. Battery charging current will only be limited by the current limit of the rectifiers."

AC MONITOR

In lieu of direct AC monitoring the controller monitors the number of installed rectifiers. When all AC power is removed the rectifier good count reaches zero an ACF alarm is generated.

EXTERNAL TEMPERATURE SHUTDOWN

THIS FACILITY **MUST NOT** BE ENABLED AS IT MAY PRODUCE UNPREDICTABLE RESULTS.

RECTIFIER CONFIGURATION

Rectifier Type – Select the type of rectifier installed in the system from the drop-down list.

Minimum Rectifiers – Enter the minimum number of rectifiers that is required to provide sufficient current to the load and to simultaneously re-charge the batteries from a fully discharged state in the desired time according to the specification of the batteries being employed with the system.

CURRENT LIMIT

Select the appropriate button for ENABLE or DISABLE this function as required.

Battery Charge Limit – When enabled enter the maximum desired battery charge current.

Using this setting the DSC1000 will intelligently control the rectifier float voltage such that the battery charge current never exceeds the set value.

17.5   Alarm Configuration

The Alarm Configuration page presents a matrix of tick boxes which are used to programme how certain system conditions affect the actions of the alarm relays and front panel LEDs. It is also used to define the 'good' condition (polarity) of the 8 auxiliary digital inputs. The screen shot below shows the factory default settings.
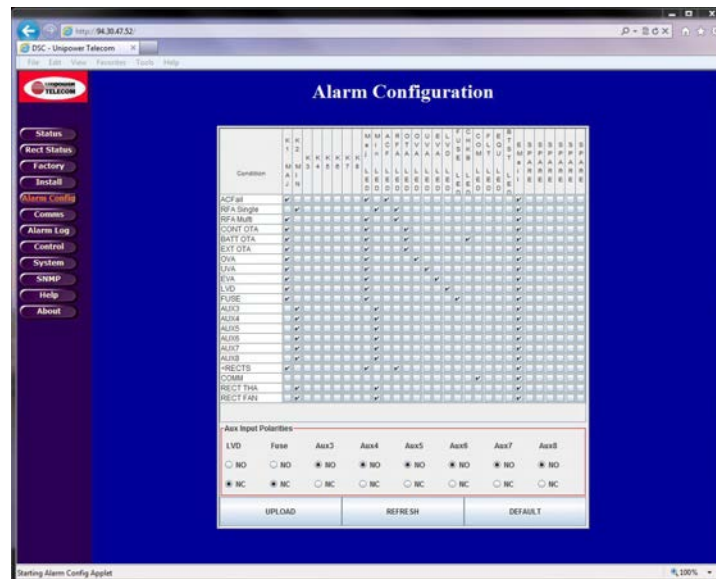
Figure 21 - Alarm Configuration WEB Page

17.5.1 Alarm Matrix Programming

K1 MAJ An item ticked in this column will enable the MAJOR alarm relay when active. Any item that is considered to represent a condition which should be acted upon immediately should be ticked.

K2 MIN An item checked in this column will enable the MAJOR alarm relay when active. Any item that is considered to represent a condition that can wait for action at a later time should be ticked.

K3 to K9 A ticked item in any of these columns will activate the relevant auxiliary alarm relay.

MAJ LED An item ticked in this column will enable the MAJOR alarm LED when active.

MIN LED An item ticked in this column will enable the MINOR alarm LED when active.

ACF LED   An item ticked in the column will activate the ACF LED when the condition occurs.

RFA LED   An item ticked in the column will activate the RFA LED when the condition occurs.

OTA LED   An item ticked in the column will activate the OTA LED when the condition occurs.

OVA LED   An item ticked in the column will activate the OVA LED when the condition occurs.

UVA LED   An item ticked in the column will activate the UVA LED when the condition occurs.

EVA LED   An item ticked in the column will activate the EVA LED when the condition occurs.

LVD LED   An item ticked in the column will activate the LVD LED when the condition occurs.

FUSE LED   An item ticked in the column will activate the FUSE LED when the condition occurs.

CHKB LED An item ticked in the column will activate the CHKB LED when the condition occurs.

COM LED   An item ticked in the column will activate the COM LED when the condition occurs.

FLT LED   An item ticked in the column will activate the FLT LED when the condition occurs.

EQU LED   An item ticked in the column will activate the EQU LED when the condition occurs.

BTST LED   An item ticked in the column will activate the BTST LED when the condition occurs.

EMAIL   When the email reporting feature is activated ticking an item in this column results in an email message being sent immediately.

17.5.2 Aux. Input Polarities

By selecting the NO or NC radio buttons for each input the 'good' condition can be set to either Normally Open or Normally Closed respectively.

Once the required alarm and input polarity settings have been selected it is necessary to click on the UPLOAD button to store the new settings in the unit's memory. To confirm that the new settings have been received and programmed click on the REFRESH button and wait a few seconds for the unit to respond. If no changes are apparent then the unit has been successfully reprogrammed.

To return the unit to the factory default settings click on the DEFAULT button.

17.6   Comms

Clicking on the Comms button loads to Controller Network Settings page. This page is used to setup the Ethernet and E-Mail communications settings.
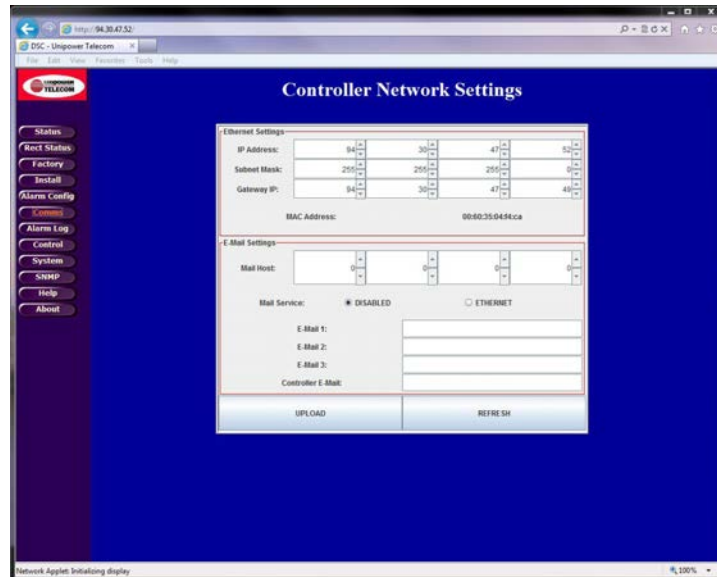
Figure 22 - Controller Network Settings

17.6.1 Ethernet Settings

17.6.1.1   IP Address

This setting defines the IP Address for the controller.

The default factory setting of 192.168.0.200 is a designated 'private' IP Address commonly used in IP based local area networks behind proxies, NAT routers or network bridges.

To enter a new IP address use the up/down arrows to dial in the required numbers or type them directly into the boxes as required. It is important to press the ENTER key on completion.

17.6.1.2   Subnet Mask

This setting defines the Subnet Mask associated with the above IP Address.

The default factory setting is 255.255.255.0.
To alter the Subnet mask use the up/down arrows to dial in the required numbers or

type them directly into the boxes as required. It is important to press the ENTER key on completion.

17.6.1.3 Default Gateway

This setting defines the Network Gateway to which the controller will route all IP traffic that is destined for any location outside the LAN to which it is connected. This setting would normally be the address for the Proxy, NAT Router or Bridge that routes network traffic to the Internet or other WAN segments.

The default factory setting is 0.0.0.0, i.e. all traffic is retained within the LAN environment.

To alter the Default Gateway use the up/down arrows to dial in the required numbers or type them directly into the boxes as required. It is important to press the ENTER key on completion.

17.6.2 E-Mail Settings

17.6.2.1 Mail Host

This setting is the IP Address of the E-Mail Server that will route SMTP messages sent by the controller.

To set the this address use the up/down arrows to dial in the required numbers or type them directly into the boxes as required. It is important to press the ENTER key on completion.

17.6.2.2 Mail Service

Select the ETHERNET radio button to switch on the E-Mail alarm facility, select the DISABLE radio button to switch it off.

17.6.2.3 E-Mail 1, 2 & 3

The DSC1000 is able to send alarm messages to up to three unique email addresses.

Type in the desired address in the E-Mail 1 box using the normal name@domain format and press the ENTER key to confirm.

Repeat as required for E-Mail 2 and E-Mail 3.

17.6.2.4   Controller E-Mail

The DSC1000 requires an email address of its own to send email alarm messages. Note, however, that it is unable to receive messages sent to this address.

Type in the desired address in the Controller E-Mail box using the normal name@ domain format and press the ENTER key to confirm.

Once all desired Ethernet and E-Mail settings have been entered click on the UPLOAD button to programme them into the controller. To confirm successful programming on these setting click on the REFRESH button, wait a few seconds for the unit to respond and then ensure that the desired settings are returned by the unit.

CAUTION: Once a new IP Address has been uploaded it will be necessary to redirect the browser to this new address in order to access the WEB pages.

17.7   Alarm Log

The Alarm Log page can be used to view a history of alarm and other conditions that have occurred.

When this page is first loaded the alarm log window will be empty.

To load the current log file click on REFRESH. After a few seconds the log data will be loaded.

To clear the log click on the CLEAR button, the refresh the page click on the REFRESH button.
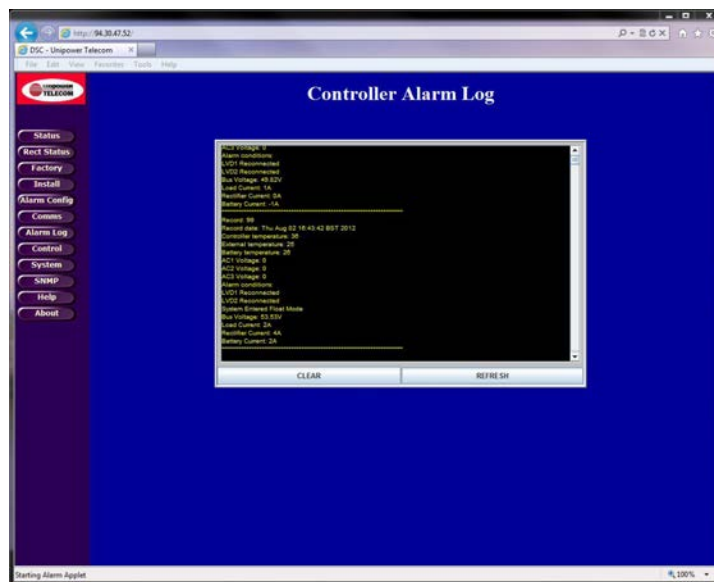
Figure 23 - Controller Alarm Log WEB Page

17.8   Control

The Controller Control Panel page is used to remotely switch the system between FLOAT and EQUALIZE modes. This page includes a 'view' of the front panel LED indicators, enabling the operator to monitor these system parameters from a remote location.

The set the system to equalize mode click on the EQUALIZE button. After a few seconds the unit will respond by switching off the FLT LED indicator and switching on the EQU LED indicator.

To return the system to float mode click on the FLOAT button. The unit will respond by returning the FLT and EQU LED indicators to their normal state.

Note that if the unit is not returned to float mode manually it will be returned automatically after the pre-programmed time has elapsed.
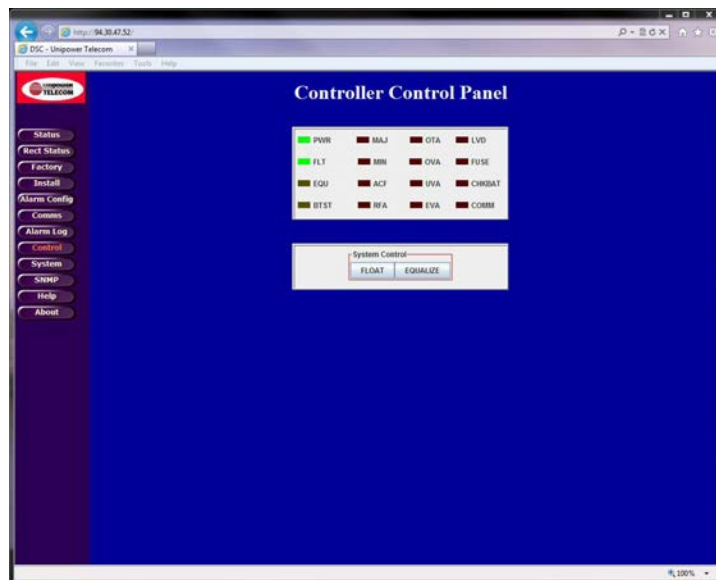
Figure 24 - Controller Control Panel WEB Page

17.9   System

The Controller System Settings page enables a user to alter the controller's real-time clock date and time settings. New date and time settings can be entered manually or automatically synchronised with a 'host' system.
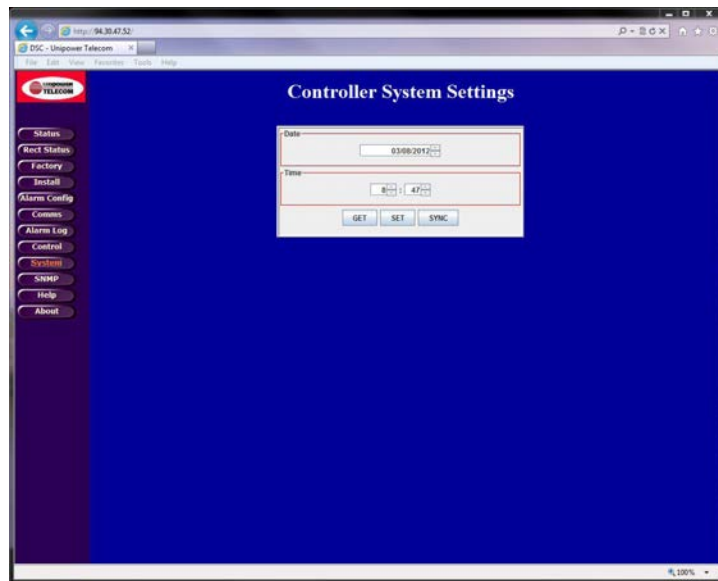
Figure 25 - Controller System Settings WEB Page

17.9.1 Manual Setting

To enter a new date and/or time manually either use the up/down buttons to dial in the desired settings or type them directly into the required boxes. Press the ENTER key in each case to confirm.

Once the desired settings have been enter click on the SET button to upload them.

17.9.2 Automatic Setting

To synchronise the date and time with the computer being used to access the controller click on the SYNC button to load the new settings from the computer and then click on the SET button to upload them.

To update this page with the controller's current date and time click on the GET button.

17.10 SNMP

The SNMP Configuration page is used to setup the controller's SNMP System Information, Alarm Trap and Agent Information parameters. It also allows the SNMP feature to be activated.

When the SNMP option has not been purchased it is not possible to enter any parameters on this page.
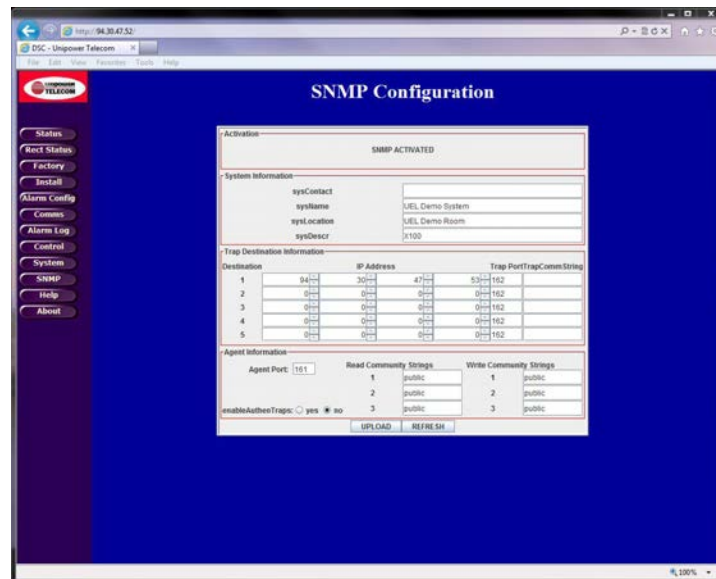
Figure 26 - SNMP Configuration WEB Page

Note: It is assumed that customers wishing to employ the SNMP features of the DSC1000 will be familiar with the necessary set-up procedure for this page.

As with all other WEB pages described in this manual it is necessary to click on UPLOAD to programme the desired settings and to click on REFRESH to review them.

Clicking on ACTIVATE will have no effect unless the SNMP feature has been purchased and installed in the unit.

The DSC1000 MIB, detailed in Appendix 3 of this manual is available for download from the UNIPOWER web site www.unipowerco.com.

17.11   Help

The Controller Help Page provides a few quick reminder notes. For more detailed help the user is referred to this manual.

Figure 27 - Controller Help WEB Page

17.12   About

The About UNIPOWER Telecom page provides contact information in case additional technical or other support is required.

Figure 28 - About UNIPOWER Telecom WEB Page

Appendix 1 – Typical System Schematic
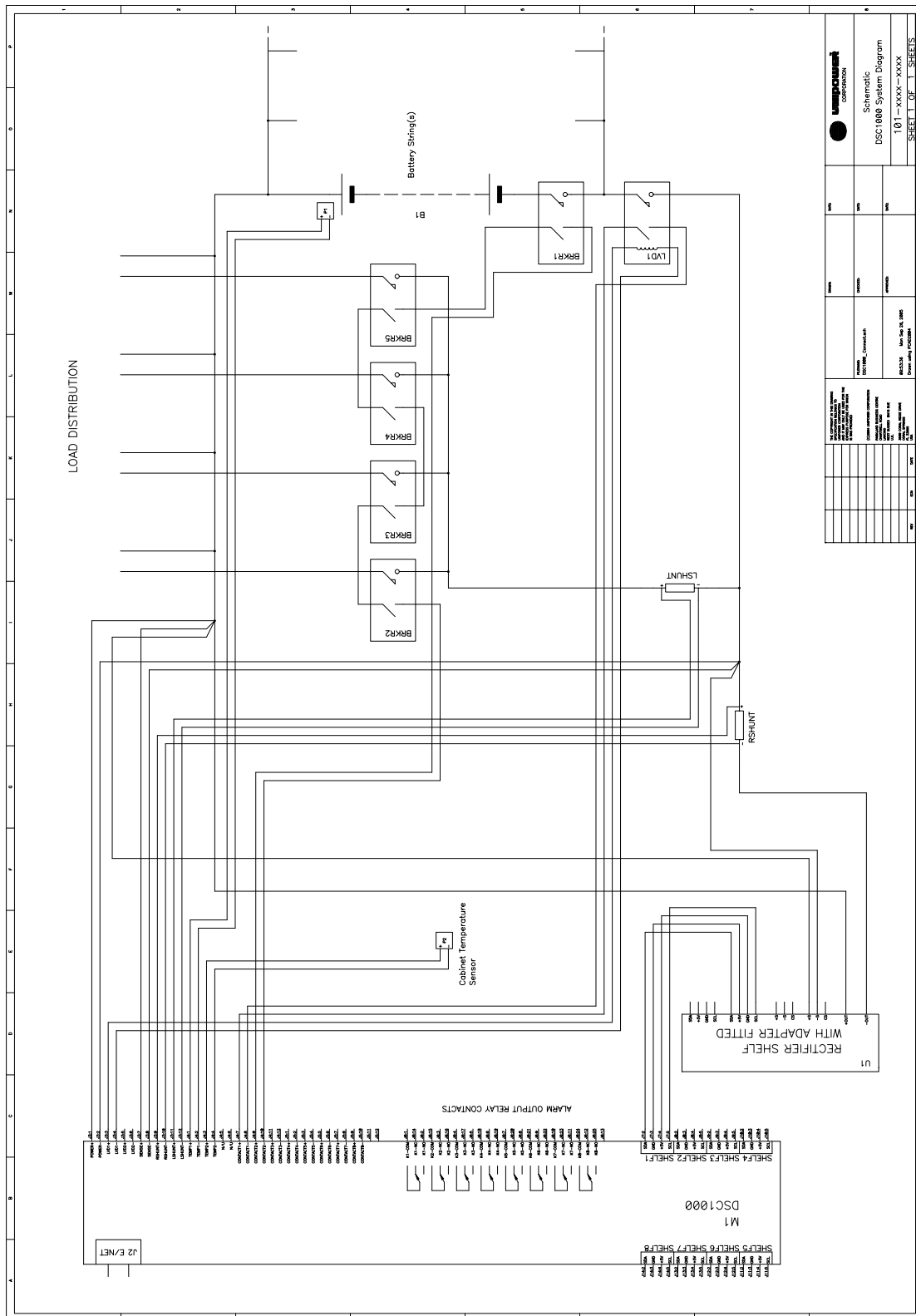
Appendix 2 – Rectifier Shelf I²C Adaptor Detail

This is an interface adapter that enables I²C version (option Z) of the UNIPOWER Sigma, Radian & Ranger series rectifier shelves and the DSC1000 to be easily integrated together in a system.

NOTE: Adaptors are not required for use with auro-he or BLUEstreak sheves as these already have an RJ45 connector for the I²C interface.

CAUTION: It is essential that the below instructions are followed carefully to avoid damage to the system equipment. The sense connections are polarity sensitive.

**INCORRECT CONNECTION MAY CAUSE SEVERE DAMAGE TO THE RECTIFIER MODULES**

J1 & J2 CONNECTIONS	
Pin	Function
1	Not Used
2	SDA – Serial Data
3	Signal GND (SENSE-)
4	+5V I²C Supply
5	SCL – Serial Clock
6	Not Used

J4 & J5 CONNECTIONS	
Term.	Function
1	SENSE +
2	SENSE -
3	CURRENT SHARE
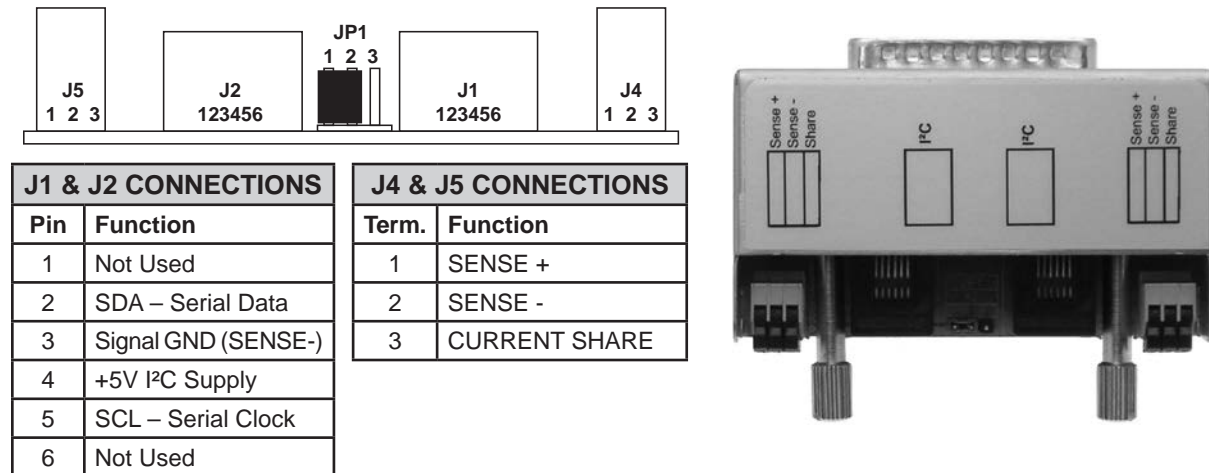
Referring to the above Figure and tables:

Sense+ should be connected to a suitable sense point on the positive DC power rail.

Sense- should be connected to a suitable sense point on the negative DC power rail.

The DC power paths from the rectifier shelf/shelves up to the system sense point should not be capable of being broken (e.g. by circuit breakers). If either power lead is broken before the sense point with power flowing, the sense leads will attempt to carry the current and severe damage will result. Circuit breakers or other power disconnect devices may be placed beyond the sense point with no cause for concern.

The share connection should be connected between all rectifier shelves in the system. It should NOT be connected to any other point. In particular, connecting it to Sense + will result in damage to the power modules.

Either of the connectors J4 or J5 may be used for connections as they are internally wired together. Two connectors are provided to simplify daisy-chaining several rectifier shelves together.
For multiple shelves, the Sense +, Sense - and Share connections can be daisy-chained across all shelf adapters and then a single pair of wires can be connected to the system sense point from the end of the chain.

The recommended wire type for the Sense and Share connections is multi-stranded 22AWG. It is suggested that different colours are used for each signal to ease identification.

JP1 (address selector) should be left in the default position (pins 1-2) where only one rectifier shelf per I²C connection to the DSC1000 is used.

If two shelves per connection are used, then the second shelf should have JP1 set to position 2-3.

When two shelves per connection are used, the two shelves can be connected together using either of the two I²C connectors (J1 or J2). J1 and J2 are identical and are internally connected together. The I²C connections between rectifier shelves and the DSC1000 can be any standard 4-way telephone cables with RJ11 connectors at either end and with no connection cross-over.

The maximum recommended cable length is 3 metres (9ft 6in). When two shelves share one connection, the total length between shelves plus the length to the controller should not exceed 3 metres (9ft 6in).

There are two Rectifier Shelf I²C Adaptors available. One is intended for use with RADIAN Series and SIGMA Series rectifiers and shelves, the other is for the RANGER Series rectifiers and shelves.

The order codes for these adaptors are:

> RADIAN/SIGMA Adaptor – 009-1001-0000
> RANGER Adaptor – 009-1000-0000

NOTE: Rectifier shelves must include the I²C option.

Appendix 3 – SNMP MIB Information.

The SNMP feature provides status read-out and alarm trapping only. All parameters described in this appendix are therefore read-only.

Refer to the appropriate sections earlier in the main body of this manual for system set-up.

Parameters for UNIPOWER DSC1000 Remote Access Controller MIB

1. **Voltages**

   Bus Voltage - Description: Live data giving actual voltage of system bus.

2. **Currents**

   Battery Current - Live data giving actual current drawn from or into battery string(s).

   Rectifier Current - Live data giving actual current drawn from rectifier power supply system.

   Load Current - Live data giving actual current delivered to the load.

3. **Temperatures**

   Battery Temperature - Live data giving actual temperature of battery string.

   External Temperature - Live data giving actual temperature of external sensor.

   Controller Temperature - Live data giving actual temperature within the controller enclosure.

4. **Rectifier Info**

   Number of Rectifiers - Live data giving number of rectifiers detected by the controller.

5. **Auxiliary Inputs**

   These are all part of one status flag held within the controller.

   > Digital Input 1 (Low Voltage Disconnect State)
   > Digital Input 2 (Fuse/Breaker State)
   > Digital Input 3
   > Digital Input 4
   > Digital Input 5
   > Digital Input 6
   > Digital Input 7
   > Digital Input 8

6. Alarms

These are all part of one alarm status flag held within the controller.

ACFAIL - Indicates an AC Failure detected by the power supply rectifiers or an external sensor.

MAJOR - Indicates that a major alarm condition requiring immediate attention has been detected by the controller.

MINOR - Indicates that a minor alarm condition requiring attention at the next scheduled maintenance has been detected by the controller.

SINGLE RECTIFIER FAILURE (SRFA) - The controller has detected that a single rectifier has failed.

MULTI RECTIFIER FAILURE (MRFA) - The controller has detected that multiple rectifiers have failed.

OVER TEMPERATURE ALARM (OTA) - The controller has detected an over temperature condition on battery/external/controller temperature sensor.

OVER VOLTAGE ALARM (OVA) - The controller has detected an over voltage condition on the bus.

UNDER VOLTAGE ALARM (UVA) - The controller has detected an under voltage condition on the bus.

END VOLTAGE ALARM (EVA) - The controller has detected an End Voltage condition, i.e. the batteries are near end of discharge.

LOW VOLTAGE DISCONNECT ALARM (LVD) - The controller has detected that one of the LVDs is open.

FUSE ALARM - The controller has detected that a fuse or breaker is open.

CHECK BATTERY (CHKBAT) - The controller has detected a fault with the battery string(s) either temperature or current related.

COMMUNICATION FAULT (COMM) - The controller has detected a problem with the internal I²C bus.

7. Settings

OVER VOLTAGE ALARM SETTING - Setting for over voltage alarm.

UNDER VOLTAGE ALARM SETTING - Setting for under voltage alarm.

END VOLTAGE ALARM SETTING - Setting for end voltage alarm.

LVD1OFF SETTING - Setting for voltage at the point where LVD1 will be shut off.

LVD1ON SETTING - Setting for voltage at the point where LVD1 will be turned on.

LVD2OFF SETTING - Setting for voltage at the point where LVD2 will be shut off.

LVD2ON SETTING - Setting for voltage at the point where LVD2 will be turned on.

FLOAT VOLTAGE - Voltage setting for the bus in float mode (modified by temp. compensation).

EQUALIZE VOLTAGE - Voltage setting for the bus in equalization mode.

NOMINAL SYSTEM VOLTAGE - The nominal system voltage (12, 24 or 48).

CONTROLLER OVER TEMPERATURE ALARM - The controller temperature, in degrees Celsius, above which an over temperature alarm will activate.

BATTERY OVER TEMPERATURE ALARM - The battery temperature, in degrees Celsius, above which an over temperature alarm will activate.

EXTERNAL OVER TEMPERATURE ALARM - The external temperature, in degrees Celsius, above which an over temperature alarm will activate.

TEMPERATURE COMPENSATION SLOPE - The parameter applied, in millivolts/°C/cell, to the float voltage to achieve temperature compensation.

TEMPERATURE COMPENSATION MAX TEMPERATURE - The temperature above which no further temperature compensation will be applied.

TEMPERATURE COMPENSATION MIN TEMPERATURE - The temperature below which no further temperature compensation will be applied.

8. Identification

SITE NAME - Holds the name of the site/system.

SERIAL NUMBER - Holds the serial number of the site/system.

9. SNMP Traps

The DSC1000 will issue a trap if any of the alarm conditions mentioned above are activated. A trap will also be issued when an alarm condition is cleared.

To obtain a copy of the latest DSC1000 MIB download it from

http://www.unipowerco.com/operating-manuals

or contact one of our sales offices.

Appendix 4 – Revision History

Rev. #	Date	Detail	Page
1	10/05	First release	
2	11/05	Revised Contents to add reference to Appendix 4. Added note on 'walk-in' feature. Added part numbers for I²C shelf adaptor modules to Appendix 2. Added Appendix 4, revision history.	2 14 56 60
3	01/06	Amendment to operating temperature range	8
4	05/07	Figure 21 – Amend default settings for rectifier thermal and fan alarms. Update to URL reference for SNMP MIB.	43 59
5	08/12	Clarifications about I²C rectifier shelf adaptor	22, 55
5a	08/12	Add note about AC monitoring facilities. Update screenshots. Add DC Walk-In. Amend AC Monitoring. Update WEB address.	26 35, 36, 38, 39, 42, 46, 49-53 41 42 59
5b	05/13	SNMP no longer an option	various
6	11/13	Add note about wire size for spring clamp terminals. Notes about Z option rectifier shelves added.	16 various
7	01/14	Add notes about Java security issues Update Figure 20 screenshot for f/w rev 4.03.	32-34 39

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