



INSTALLATION & OPERATING MANUAL
X300 SERIES
DC POWER POWER SYSTEM

www.unipowerco.com

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CONTENTS

1.0	INTRODUCTION.....	4
2.0	FEATURES & OPTIONS	5
3.0	SAFETY WARNINGS.....	5
4.0	WARRANTY (summary).....	6
5.0	UNPACKING AND INSPECTION.....	6
6.0	GENERAL SPECIFICATIONS.....	7
7.0	PRINCIPAL OF OPERATION	9
8.0	FRONT PANEL DESCRIPTION	10
9.0	REAR PANEL DESCRIPTION.....	12
10.0	LED INDICATORS	14
11.0	MAKING CONNECTIONS TO THE X300	16
12.0	INSTALLATION	19
13.0	USING THE FRONT PANEL DISPLAY ON THE X300 CONTROLLER	22
14.0	LVD OPTIONS	30
15.0	USING THE CONTROLLER WEB BROWSER INTERFACE.....	31
	Appendix 1 – SNMP MIB Information	54
	Appendix 2 – Revision History.....	58

FIGURES

Figure 1	X300 Compact Integrated DC Power System	4
Figure 2	Block Schematic	9
Figure 3	Expanded System Front View with Cover Panel Removed.....	10
Figure 4	Controller on/off switch detail	10
Figure 5	Breaker Alarm Enable Detail.....	11
Figure 6	Expanded System Rear View	12
Figure 7	LED Indicators.....	14
Figure 8	Rectifier Module LED Indicators.....	15
Figure 9	LCD Default Display Condition	22
Figure 10	Keypad	22
Figure 11	Controller Status WEB Page (typical)	35
Figure 12	Rectifier Status WEB Page (typical).....	36
Figure 13	Controller Factory Calibration WEB Page (typical).....	38
Figure 14	Controller Site Installation WEB Page (typical).....	39
Figure 15	Alarm Configuration WEB Page (typical).....	43
Figure 16	Controller Network Settings (typical).....	46
Figure 17	Controller Alarm Log WEB Page (typical).....	49
Figure 18	Controller Control Panel WEB Page (typical).....	50
Figure 19	Controller System Settings WEB Page (typical)	51
Figure 20	SNMP Configuration WEB Page (typical)	52
Figure 21	Controller Help WEB Page (typical)	53
Figure 22	About UNIPower Telecom WEB Page (typical).....	53

TABLES

Table 1 - Rectifier module GREEN LED Status.....	15
Table 2 - Rectifier module RED LED Status	15
Table 3 - DC Cable Kits.....	16
Table 4 - Battery Temp. Probe & Alarm Relay Connector Pin-Out.....	17
Table 5 - Ethernet Connector Pin-Out	18
Table 6 - Input Current Ratings	19
Table 7 - Keypad Button Description	22
Table 8 - Rectifier I ² C Addressing	36

1.0 INTRODUCTION

Gravitas X300 is an ultra-compact, integrated DC power system. The base system is a 2RU shelf, expandable to 3RU, to provide output loads to 300A. These systems hold up to 4 high efficiency hot-swap rectifiers in the 2RU systems and up to 8 rectifiers in the 3RU expanded systems. Standard output voltage ratings are -54.4VDC, +27.2VDC, and +15.6VDC. Loads up to 300A are available with either non-redundant or redundant (N+1) systems. The 92% high efficiency rectifiers are internally fan cooled with speed control which is a function of load and temperature, keeping acoustic noise to a minimum.

The DC output circuits can provide up to 10 loads which utilize pluggable circuit breakers rated up to 60A each. 2 additional breakers, fitted as standard can be configured as additional load circuits at 100A or alternatively for battery protection rated at 125A each with non-pluggable breakers. A low voltage battery disconnect (LVD) is provided as standard with LVD override or battery emergency power off (EPO) available as options. An unprotected battery feed output is provided as standard for applications where battery protection is provided externally.

The remote access controller monitors system parameters, controls rectifier output, and provides alarms for system failures. The Controller Module is also pluggable for easy field replacement in case of failure. There are 2 LED alarm indicators which indicate failures, Major Alarm and Minor Alarm. A third green LED indicates the controller is working properly. Four form-C relay outputs provide the alarms for remote use. The system can be programmed by means of a remote PC web page display. Communication is by Ethernet LAN with SNMP (Simple Network Management Protocol) including alarm trapping. It also has provision for temperature compensated charging of an external battery using a supplied TC probe. An LCD Display/Touchpad is included for local metering, status, and setup.



Figure 1 - X300 Compact Integrated DC Power System

2.0 FEATURES & OPTIONS

2.1 Standard Features

- ◆ 2RU High Base System (up to 4 rectifiers)
- ◆ 3RU High Expanded System (up to 8 rectifiers)
- ◆ High Efficiency Rectifiers (91%)
- ◆ Remote Control & Monitoring via TPC/IP Ethernet LAN
- ◆ Field Replaceable Controller
- ◆ Up to 300A at -54.4VDC, +27.2VDC or +15.6VDC
- ◆ Wide Range AC Input
- ◆ Up to 12 DC Load Circuits
- ◆ High Capacity Pluggable Circuit Breakers
- ◆ Quick and Easy Installation
- ◆ 19-Inch Rack Mounting
- ◆ SNMP reporting and Alarm Trapping

2.2 Options & Accessories

- ◆ Low Voltage Disconnect – Option Y
- ◆ Battery Emergency Power Off (EPO) – Option E
- ◆ Additional Temperature Probe for External Temperature Measurement

3.0 SAFETY WARNINGS

- 3.1** The X300 Compact DC Power System operates at voltages that could 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 X300 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 X300 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)

X300 Series DC power systems are 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 X300 DC power system 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, **do not attempt to install the unit.** The freight carrier should be notified immediately and a claim for the cost of the X300 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

6.1 Inputs

Supply Voltage: 85-264VAC Single Phase
Each rectifier position is supplied via an individual screw terminal block connection.

A 3-phase supply may be connected to the X300 by connecting a single A, B or C phase to each rectifier input L & N. Connection across L & N can be PH to PH or PH to N (264Vac max).

Supply Current: Max 14A input @ 85-264VAC, 10A/input @ 180-264VAC.

Battery Input: Direct connection to DC output bus via protection breakers.

Digital alarm 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

10 Pluggable Breaker Distribution: Positions 1-10, maximum 60A per circuit

2 Fixed Load / Battery Breakers: Positions 11 & 12, maximum 100A for loads or 125A for battery.

Alarm Relay Contacts: Form C, 1A max at 30VDC.

Ethernet: 10/100 Base T

6.3 Protection

Supply Input: Each rectifier is individual fused internally on the AC input.

Battery: 125A Magnetic Circuit Breakers.

Output Distribution: Ten field pluggable circuit breakers, 5-60A.
Two factory installed 100A breakers in place of battery breakers.

Bulk DC Bus: Rectifier Current Limiting / Battery Breaker.

LVD: 300A max Battery Low Voltage Disconnect.

Temperature Probes: Battery Temperature charge compensation.

6.4 Safety

The X300 is compliant with UL60950-1, EN60950-1, CSA22.2-60950-1 and all other derivatives of the core IEC60950-1 standard when installed correctly within a restricted access environment.

The X300 is CE marked to indicate conformance to the European Union's Low Voltage and EMC Directive.

6.5 EMC

The X300 complies with the following Norms when correctly installed.

Conducted Emissions: EN55022, level A

Radiated Emissions: EN55022, level A

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

6.7 Physical Specification

Case Material: Steel

Finish: Clear Passivated

Dimensions: <2RU (base) or <3RU (expanded) H x 17.34 (440) W x 18.04 (458) D
Inches (mm)

Rack Width: 19" or 23" using dual purpose kit supplied.

NOTE: Mid-mount is recommended when used in free space.

7.0 PRINCIPAL OF OPERATION

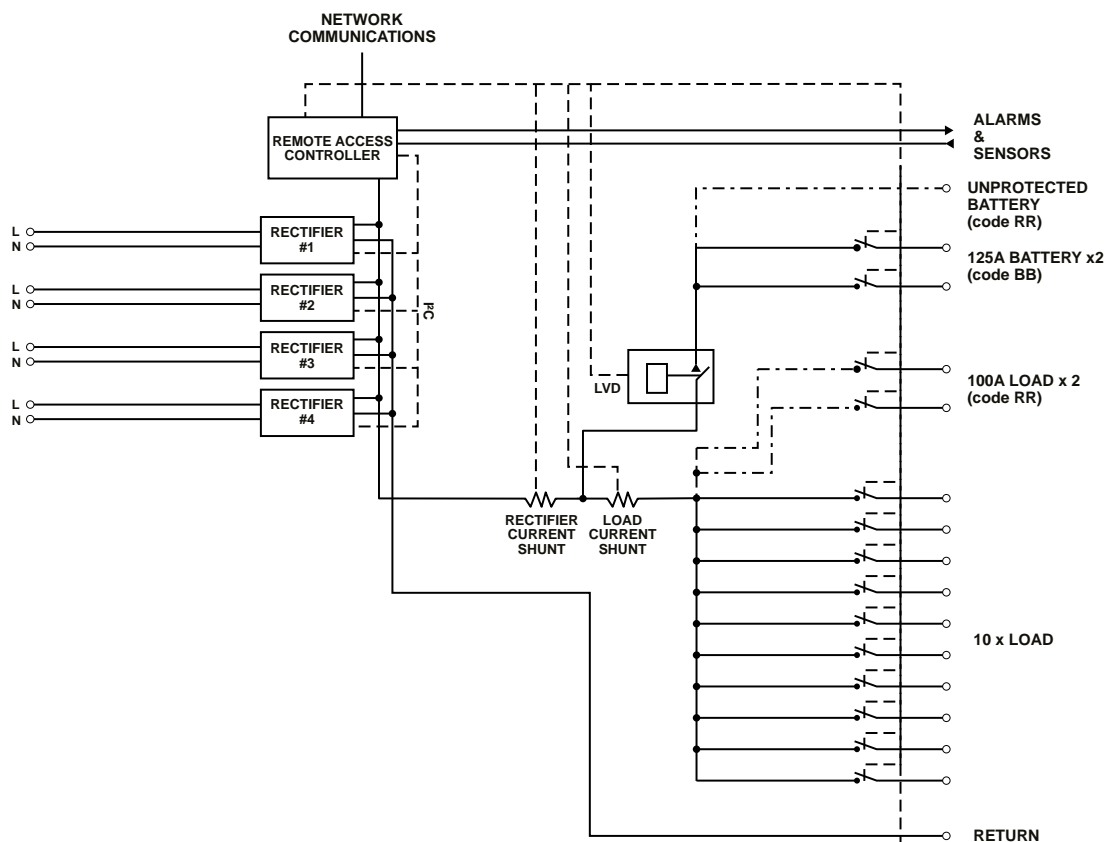


Figure 2 - Block Schematic

- 7.1** 85-264VAC is supplied directly to each of the rectifiers which produce a nominal -48VDC, +24VDC or +12VDC output.
- 7.2** The rectifier DC output is fed to the battery terminals the LVD (Low Voltage Disconnect, current shunt and 2 x 125A circuit breakers (code BB).
- 7.3** The rectifier DC output is also fed to the loads via up to 10 circuit breakers (code BB) or 12 circuit breakers where two are fixed 100A (code RR). Breakers 1 to are pluggable.
- 7.4** The management unit monitors and controls the rectifiers via an I²C interface and also checks the status of the DC load and battery breakers/fuses.
- 7.5** The management unit monitors external sensors and provides alarms.

8.0 FRONT PANEL DESCRIPTION

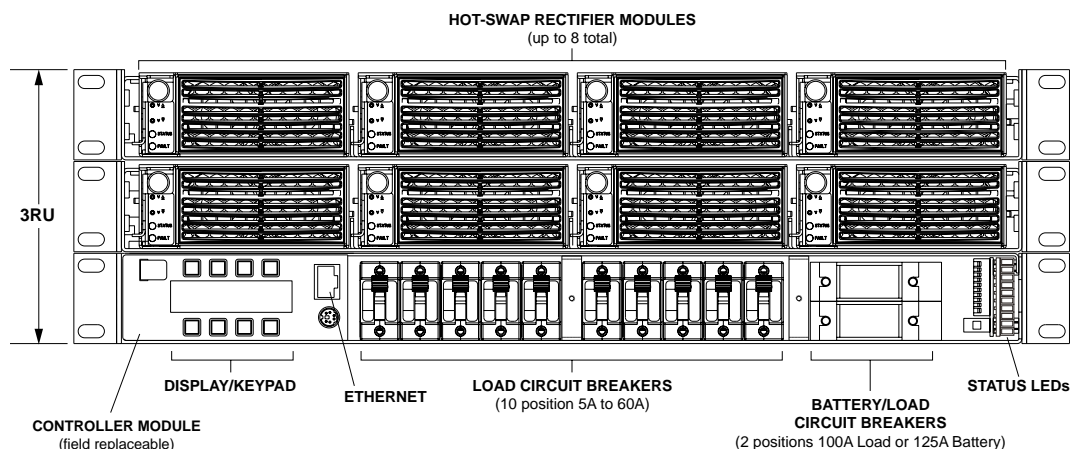


Figure 3 - Expanded System Front View with Cover Panel Removed

Figure 3 shows the expanded system configuration as viewed from the front. Following is a description of each section.

- 8.1 RECTIFIERS:** The top section includes 4 (base system) or 8 (expanded system) rectifier slots. Each slot can accept one rectifier from the BLUEstreak Series rated up to 2000W output power. Only identical model rectifiers of appropriate output voltage may be installed at the same time. For example, a nominal -48V system may contain up to 8 model RBSR48/37 or RBSR48/28 but not a mixture of the two types.

Rectifier shelf #1 is closest to the distribution shelf. Shelf #2 is the top most shelf.

- 8.2 CONTROLLER / COMMUNICATIONS:** Below the rectifiers at the left side is the system controller with LCD Display & Keypad and the Ethernet port for remote communications via a TCP/IP LAN connection. There is also a console port which is for factory use only. (see sections 13 & 15 for controller setup)

- 8.2.1 CONTROLLER INSTALL / REMOVAL:** To the far right (see figure 4 below) is the controller on/off switch. This switch must be placed in the off position prior to controller install or removal to ensure it is not damaged in an energized system. Removing the controller while in the ON position can damage the system and void the warranty.

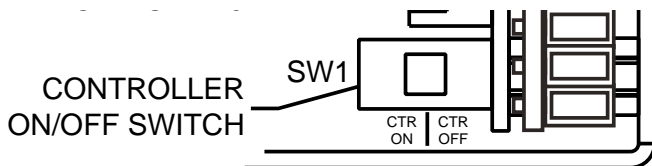


Figure 4 - Controller on/off switch detail

(NOTE: The LCD display will stay illuminated even in the off position if batteries are connected)

8.3 **LOAD BREAKERS:** Across the centre of the unit is the DC distribution section which may contain up to 10 pluggable circuit breakers 5-60A max. A puller tool is supplied to assist removal of the breakers.

8.3.1 **LOAD BREAKER ALARMS:** At the far right there is a set of 10 DIP switches to enable breaker alarms (see figure 5 below). For each breaker position installed the corresponding DIP switch must be enabled otherwise an alarm will not be received. Blank positions must be disabled.

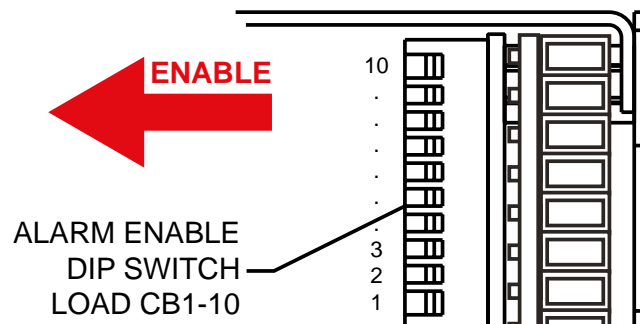


Figure 5 - Breaker Alarm Enable Detail

8.4 **HIGH CURRENT BATTERY / LOAD BREAKERS:** To the right of the load breakers are two breakers positions 11 & 12 that are factory configured for battery (125A) or load (100A). (NOTE: when configured as loads external battery protection is required)

8.4.1 **LOW VOLTAGE DISCONNECT (Internal):** The LVD is internal and connects the batteries via the REMOTE BAT connection and/ or the BATTERY BREAKER (Position 11 & 12).

When positions 11 & 12 are used for LOAD BREAKERS the LVD connects to the REMOTE BAT only.

8.5 **ALARM LEDS:** Finally there are 9 LED indicators which display various status and alarm conditions. These are described in more detail in section 10.

9.0 REAR PANEL DESCRIPTION

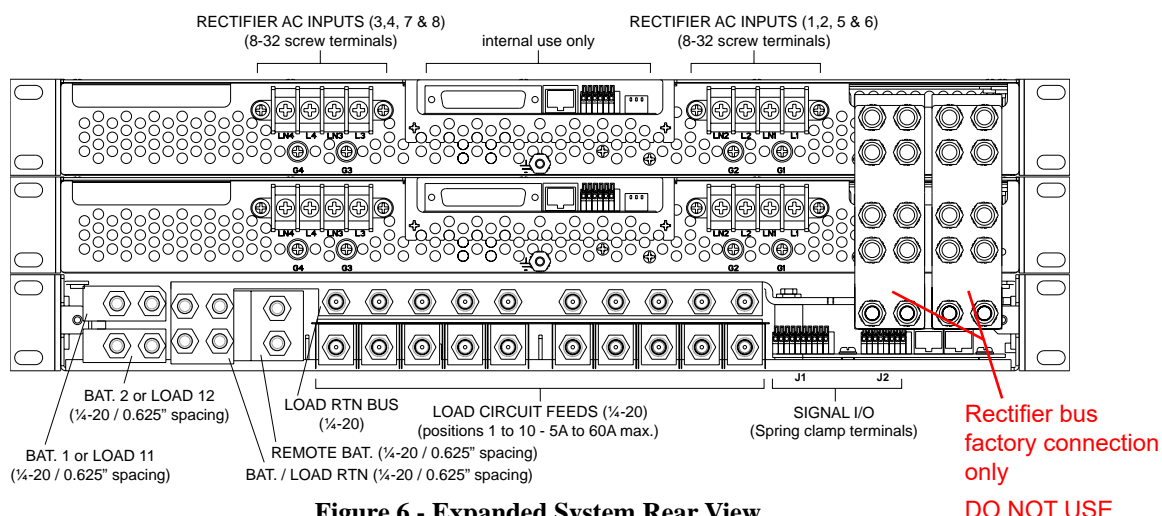


Figure 6 - Expanded System Rear View

Figure 6 shows the expanded system configuration as viewed from the rear. Following is a description of each section.

- 9.1** The rear view of the expanded 3RU system is shown. The top two shelves will accommodate up to 4 rectifiers per shelf for a total of 8 rectifiers. The 2RU base system has only one shelf for a total of 4 rectifiers. The shelf closest to the distribution shelf is always rectifier shelf 1 (RS1), in an expanded system the uppermost shelf is RS2.

The signal I/O shown at the centre of the rectifier shelves D-sub and RJ45 are for internal control & system communications between the rectifier and main system shelves.

MOVING / CHANGING CABLES WILL VOID WARRANTY AND AFFECT SYSTEM OPERATION

ATTENTION: At the far right are two bus bars that feed the DC from the rectifier shelves to the main system shelf. No external connections may be made to these bus bars and the bolted connections must not be altered or used in any way, otherwise the system may not function correctly and the warranty may be void.

- 9.2** On the base system there are four rectifier AC inputs while on the expanded system there are eight, one for each rectifier. Each AC input is identified as follows: Module 1 is L1, LN1 & G1; module 2 is L2, LN2 & G2; module 3 is L3, LN3 & G3 and module 4 is L4, LN4 & G4. The same designations are used on both the top and bottom rectifier shelf.

When viewing from the front of the system module 1 is on the left and module 4 is on the right. When viewing from the rear of the system the AC input for module 1 is on the right and for module 4 is on the left.

The input wires should be sized at 20A minimum. The AC terminals have 8-32 screws.

9.3 BATTERY AND RETURN TERMINALS:

The two protected battery terminals are to the far left of the main system shelf. These can be configured in the factory for connection of two battery strings designated 11 & 12 and are protected by circuit breakers at 125A per position. The terminals are ¼ - 20 studs narrow tongue, 2 x 1 post with 0.65" spacing for anti-rotation. All battery connections are designed to allow use of standard ¼ - 20 2-hole lugs.

9.3.1 Both these breakers are in series with the internal LVD (300A) which is automatically opened by when the battery voltage drops below acceptable limits set in the controller.

9.3.2 To the right of these terminals is the battery return bus bar with a 2 x 2 0.65" spacing terminal configuration. These terminals are ¼ - 20 studs narrow tongue.

9.3.3 REMOTE BATTERY is an "unprotected" battery feed shown to the right of the return bus bar. This provides a means to connect additional battery strings to the system for longer back-up times or if only external shelf battery breakers are used.

This battery feed is also connected to the load bus through the LVD contactor (225A) and will open when the contactor is de-energised

NOTE: PROTECTION MUST BE PROVIDED EXTERNAL TO THE SYSTEM WHEN USING THIS CONNECTION.

9.4 LOAD CIRCUITS: The field pluggable load circuit feeds 1 to 10, at the centre of the main system shelf, are sourced through the corresponding pluggable circuit breakers identified as 1 to 10 on the front of the unit. A circuit breaker puller tool is supplied with each unit to add in breaker removal.

The circuit breakers have a maximum allowed rating of 60A each. The return (RTN) terminal for each load is directly above the load terminal on a common system load return bus. For -48V systems this bus is +VE with respect to the load terminals whereas for +24V and +12V systems it is -VE with respect to the load terminals.

All breaker feeds and returns use ¼ - 20 posts.

NOTE: INSTALLING CIRCUIT BREAKERS GREATER THAN 60A CAPACITY IN LOAD POSITIONS 1 TO 10 MAY RESULT IN A HAZARDOUS CONDITION OCCURRING AND COULD VOID THE WARRANTY.

9.5 POS 11 & 12 HIGH CURRENT LOAD BREAKER OPTION:

When POSITION 11 & 12 are used for high current load feeds instead of battery they are sourced from the internal load bus via circuit breakers rated at 100A in positions 11 & 12 on the front panel.

In this case the REMOTE BAT "unprotected" battery feed is the only means for connecting external battery strings as described in 8.3.3 above.

9.6 USER SIGNAL I/O: To the far right of the main system shelf are two banks of spring clamp terminals for signal connections, designated J1 and J2. (see section 11.2.)

All relay alarm outputs are isolated Form-C contacts that may be floated from GROUND by up to 100V. Maximum contact current and voltage are 1A and 30V (DC or AC) respectively. There are a total of four relay outputs with Normally Open (NO), Normally Closed (NC) and Common (COM) contacts available for connection.

The alarm relays are designated K1 to K4. K1 and K2 are pre-programmed for MAJOR and MINOR alarm conditions. K3 and K4 are not pre-programmed. The function of each alarm relay may be programmed as desired using the Alarm Configuration WEB page described in section 15.5 of this manual.

A temperature probes (supplied as standard) can be connected for Battery Temperature Compensation to pins 7 and 8 of J1. A second temperature (supplied as an additional accessory item) can be connected to pins 7 and 8 of J2 and may be used to measure any external temperature.

10.0 LED INDICATORS

10.1 FRONT PANEL LED's: During normal operation there will be one green LED displayed as shown in figure 7 opposite.

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

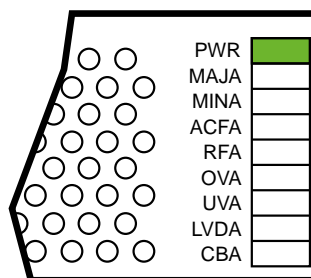


Figure 7 - LED Indicators

- PWR – **GREEN** – Indicates that the unit has power.
- MAJA – **RED** – Indicates a 'Major' (Immediate Response) alarm condition.
- MINA – **RED** – Indicates a 'Minor' (Scheduled response) alarm condition.
- ACFA – **RED** – Indicates all rectifiers are not functioning.
- RFA – **RED** – Indicates a rectifier module failure.
- OVA – **RED** – Indicates that the system BUS voltage is too high.
- UVA – **RED** – Indicates that the system BUS voltage is too low.
- LVDA – **RED** – Indicates that the LVD contactor is open.
- CBA – **RED** – Indicates that that a circuit breaker is open.

10.2 MODULE LED's: Each rectifier module also has status LED's that will also generate alarms for section 10.1 controller and front panel.

10.2.1 GREEN LED (Top LED)

LED Status	Condition
ON	DCOK is true
Flashing	DCOK is false, unit is inhibited or not enabled
OFF	DCOK is false, unit is not inhibited

Table 1 - Rectifier module GREEN LED Status

10.2.2 RED LED (Bottom LED)

LED Status	Condition	Possible causes
ON	DC output OFF	Temperature above/below allowed limits. OVP. Overcurrent or Short Circuit (DCOK goes FALSE). Processor Failure. (Green LED OFF).
FLASHING	DC output ON (warning)	Fans below expected speed. Temperature high/low. Output current close to maximum. Output on but DCOK FALSE. AC input voltage outside range.
OFF	DC output ON	

Table 2 - Rectifier module RED LED Status

10.2.3 LED STATUS LEGEND

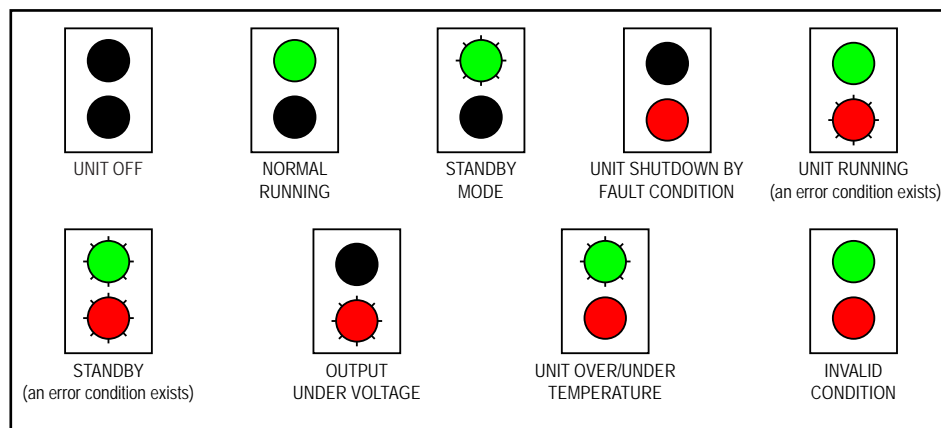


Figure 8 - Rectifier Module LED Indicators

11.0 MAKING CONNECTIONS TO THE X300

11.1 DC Load Connections

For each main load circuit there is one terminals marked 1 through 10 respectively for the DC ‘feed’ to the load and one marked RTN for the DC ‘return’ from the load.

Note that in the case of -48VDC system the ‘feed’ terminals are at a negative potential with respect to the ‘return’ terminals. In the case of +24VDC and +12VDC systems the ‘feed’ terminals are at a positive potential with respect to the ‘return’ terminals.

When connecting to the DC load terminals it is important to ensure that the cables used are adequately sized to carry the expected load current for the circuit in question.

UNIPOWER supplies the following standard cable sets. Order separately using the part numbers shown. 2 hole lug terminations are recommended at the system end of the cable.







DC CABLE KIT - 1 to 2 LUG 30"	Part No.: 775-1497-1230	Start Lug	End Lug
Pair of Black / Red #4AWG copper cable (600V 125A) 30" (76cm) with lug terminations and heat shrink. Hole size 0.25", tongue width 0.55", spacing 0.625".			
DC CABLE KIT - 2 to 2 LUG 30"	Part No.: 775-1497-2230	Start Lug	End Lug
One pair Black / Red #4AWG copper cable (600V 125A) 30" (76cm) with lug terminations and heat shrink. Hole size 0.25", tongue width 0.55", spacing 0.625".			
DC CABLE KIT - 1 to 2 LUG 84"	Part No.: 775-1497-1284	Start Lug	End Lug
One pair Black / Red #4AWG copper cable (600V 125A) 84" (213cm) with lug terminations and heat shrink. Hole size 0.25", tongue width 0.55", spacing 0.625".			

Table 3 - DC Cable Kits

11.2 Alarm Relay and Battery Temperature Probe Connections – J1 & J2

Connections to the Form-C alarm relay outputs are made through the two banks of way spring clamp terminal connectors. There are a total of 4 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.

The alarm relays are designated K1 to K4. K1 and K2 are pre-programmed for MAJOR and MINOR alarm conditions by default. K3 and K4 are not programmed for any alarm function.

The function of each alarm may be programmed using the Alarm Configuration WEB page described later in section 15.

Connection of the supplied battery temperature probe, if required, is made using terminals 7 and 8 of spring clamp terminal bank J1 and for the optional external temperature probe to terminals 7 and 8 of spring clamp terminal bank J2.

Terminals 9 and 10 of spring clamp terminal bank J1 form a contact closure input that can be used to sense an external event such as door alarm.

NOTE: Any sensor, such as a switch or relay, which is connected to the digital input, **MUST** have galvanic isolation.

This connector accepts wire sizes from #28AWG to #10AWG.

The optional external temperature probe is identical to the battery temperate probe that is supplied as standard, so there is no risk of mixing the two up on receipt.

J1 CONNECTIONS	
TERMINAL	FUNCTION
1	K1 - MAJ ALARM – N/O
2	K1 - MAJ ALARM – COM
3	K1 - MAJ ALARM – N/C
4	K2 - MIN ALARM – N/O
5	K2 - MIN ALARM – COM
6	K2 - MIN ALARM – N/C
7	BATT. TEMP. PROBE +
8	BATT. TEMP. PROBE -
9	INPUT ALARM CONTACT -
10	INPUT ALARM CONTACT +

J2 CONNECTIONS	
TERMINAL	FUNCTION
1	K3 – FREE ALARM – N/O
2	K3 – FREE ALARM – COM
3	K3 – FREE ALARM – N/C
4	K4 – FREE ALARM – N/O
5	K4 – FREE ALARM – COM
6	K4 – FREE ALARM – N/C
7	EXT. TEMP. PROBE +
8	EXT. TEMP. PROBE -

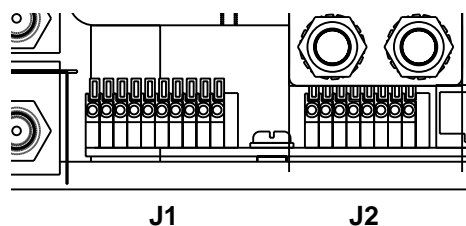


Table 4 - Battery Temp. Probe & Alarm Relay Connector Pin-Out

Note that terminal 1 is to the left when viewed from the rear of the system.

11.3 Ethernet Connection – J3

The X300 is connected to a TCP/IP LAN (Local Area Network) or directly to a PC using connector J3. This is a standard RJ45 network connector allowing connection of any generally available Ethernet cable. Note that if the X300 is to be connected directly to a PC rather than a LAN then a cross-over Ethernet cable will be required.

J3 CONNECTIONS	
TERMINAL	FUNCTION
1	TX +
2	TX -
3	RX +
4	Not Used
5	Not Used
6	RX -
7	Not Used
8	Not Used

Table 5 - Ethernet Connector Pin-Out

12.0 INSTALLATION

The X300 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.

CAUTION: Re-read the Safety Warnings and Precautions in Section 3. All power should be OFF for the input and output loads before making connections. Connection of the X300 chassis to frame ground should be made first. If the X300 has been turned on before installation connections, it should be turned off and given a 5-minute waiting period for all internal energy storage capacitors to be discharged.

12.1 Input AC Power Connection

3-wire AC power lines should be connected to each of the input terminal block but not plugged into the AC power source. The line, neutral and ground connections should be carefully observed when making the AC connections. The AC line cord should be sized to safely carry 20 amperes AC minimum for each AC input / rectifier.

MODEL	Vin AC	Vout DC	WATTS	A @ 120Vac	A @ 240Vac
RBSR12/100	85-264	15.6	1360	12.5	7
RBSR24/54	85-264	27.2	1469	15.5	7.6
RBSR24/60	85-132	27.2	1469	15.5	n/a
RBSR24/60	180-264	27.2	1632	n/a	8.2
RBSR48/28	85-264	54.4	1500	14	7.5
RBSR48/37	85-132	54.4	1500	14	n/a
RBSR48/37	180-264	54.4	2000	n/a	10

Table 6 - Input Current Ratings

Note: ratings given are at nominal voltage for sizing breakers. Label rating may be greater.

12.2 Checking Outputs

Turn all output circuit breakers to the OFF position. With no loads connected and without the battery connected, plug in or connect the AC input cords one at a time to the AC power source. Be sure to use the correct AC voltage for the rectifier inputs.

Using a volt meter measure the DC voltage reading across the –VO and +VO bus bars connecting the rectifier section to the lower section at the rear of the unit. The voltage should be approximately 45 - 54.4, for a 48V system and scale down for both 27.2 and 15.6VDC (depending on model), which is the factory setting.

This is due to the initial DC WALK IN feature to prevent limit battery current even if batteries are not connected. To disable this feature and go directly to the float voltage, see section 15.4.

One by one, turn each output circuit breaker to the ON position and measure the DC voltage across the corresponding output terminals. The voltage should again read approximately 54.4, 27.2, or 15.6 volts. After each output is measured, turn OFF that circuit breaker and turn ON the next one. After measuring the last circuit, turn off that breaker and make sure that all output breakers are in the OFF position.

Next, unplug or disconnect the AC input power source. Before touching any terminals wait 5 minutes for the internal storage capacitors to discharge.

12.3 Controller Section Operation and Settings

The controller is preset from the factory. To change factory default setting see section 15.

Next, make any required signal connections, controller adjustments, temperature compensation adjustment and alarm enabling settings.

WARNING: Remember to take precautions each time the system is turned on and also when connecting or disconnecting the battery. Remember that the battery presents an energy hazard at its terminals. Also remember to allow 5 minutes for internal capacitors to discharge after disconnecting the AC input power and the battery.

12.4 Connection to Battery

WARNING: Improper polarity of the battery connection may damage the power system. Take precautions when installing the battery and note that the battery cables are “hot” (live) and present an energy hazard.

With AC input unplugged, remove the three rectifier modules from the system chassis. Make sure all load circuit breakers are in the OFF position. Set the battery circuit breakers to the OFF position. Carefully connect the battery cables to the battery terminals shown in Figure 2 while observing the correct polarity.

NOTE: The BAT bus must have a voltage greater than the LVD close voltage set in the controller. This occurs when at least one rectifier is on.

12.5 Connection to Loads

With input AC power unplugged, the battery disconnected and no other power sources connected to the loads, make sure that all load circuit breakers are set to the OFF position. Connect load wires to each set of output terminals, one at a time. Note that the front panel breaker and fuse numbers directly correspond to the output terminal numbers. Be sure to connect the polarities correctly.

12.6 System Turn-On

Perform the following operations:

1. Set the battery and all load circuit breakers to the OFF position.
2. Plug in the rectifier modules.
3. Connect the AC power cables to the AC source.
4. Check that the green LED on the front panel has lit. After approximately 20 seconds for initialization the MAJ LED at least will light.
5. Set the battery circuit breaker to the ON position. Then set the load breakers to the ON position.
After approximately 5 seconds the status of MAJ LEDs will change, dependent on the number of rectifiers installed.

Using the WEB browser interface described in section 15 it is now possible to check overall system status for correct operation.

*NOTE: During the 30 seconds initialization period the system bus voltage will be at the factory preset level of the rectifiers. Nominally 54.4V, 27.2V or 15.6V depending on system. If the **DC WALK IN** feature is enabled the controller will lower the output voltage by approximately 15% in order to limit current flowing to the batteries. During a following period of approximately 15-30 minutes the controller will ramp the system voltage up to the correct float voltage as determined by the temperature compensation algorithm.*

It is important to ensure that the load current reading does not exceed the maximum capacity of the installed rectifiers or, where N+1 operation is required, the maximum capacity of one less than the total number of rectifiers installed. Note also, that the system should have been sized so that a proportion of the available rectifier capacity is allocated for battery charging. Where N+1 redundant operation is used the additional 'spare' rectifier will normally provide this current.

NOTE: Once normal operation is established the alarm log should be cleared.

13.0 USING THE FRONT PANEL DISPLAY ON THE X300 CONTROLLER

13.1 LCD ALPHANUMERIC DISPLAY

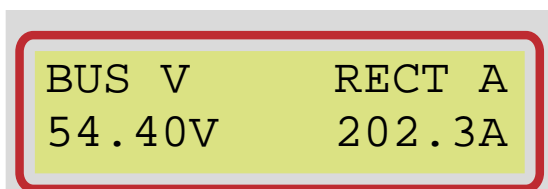


Figure 9 – LCD Default Display Condition

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

13.2 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.

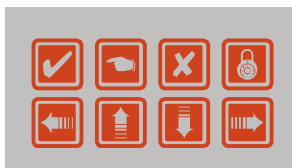


Figure 10 - Keypad

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 7 - Keypad Button Description






13.3 FRONT PANEL ACCESS TO SYSTEM STATUS & PROGRAMMING

The Front Panel Alphanumeric LCD display along with the keypad can be used to access all of the status and programming functions of the X300 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.


13.3.1 Press  to access the level 1 passcode display 

13.3.2 Using the     keys dial in the level 1 passcode and press  to confirm.



The level 1 passcode is factory set to '111'.

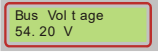
At this point you will have access to the top level menus.

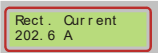
To enter each menu press  and to exit press .

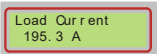
Press  at any time to return to the normal operating display.

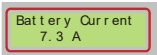
13.4  The status menu displays the following system parameters:

Press  or  to scroll through the status menu.

 Displays the system bus voltage.

 Displays the total rectifier current.

 Displays the total load current.
 The X300 utilises two system shunts to measure total rectifier current and total load current. Total load battery is then calculated using these two measurement.

 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.

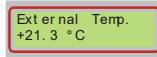


Displays the battery temperature.

Battery temperature is measured using a probe supplied with the X300 that is attached to one of the battery terminals.




Displays the X300 control unit's internal temperature.



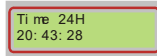
Displays the temperature measured by an optional measurement probe.

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.

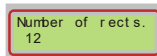


AC1/AC2/AC3 not used in the X300



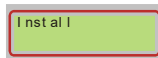


Displays the system date and time. The X300 contains a real-time clock with its own internal battery supply. This clock can be synchronised with the real-time clock of any system connected through the WEB interface.











Displays the number of rectifiers installed in the power system. The maximum number for the X300 is 8.


13.5

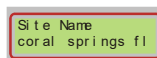


The Install menu is used to set up the following parameters at the time of system installation:

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.



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

Serial Number VWY999999	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 the voltages at which the LVD1 contact will be opened as the battery voltage falls during a discharge cycle. (LVD2 not used)
Set LVD2 Off 42.0	
Set LVD1 On 46.5	Set the voltages at which the LVD1 contact will be closed once the AC supply has been restored. (LVD2 not used)
Set LVD2 On 42.5	
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. (example for a -48V battery system # = 24)

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
RFS

Matches the X300 with the characteristics of the rectifiers installed in the system. (Default for the X300 is RBSR only)

Set Sys. Type
48

Sets the X300 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

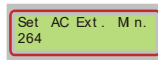
Sets the date in the internal real-time clock.

Set Equ. Time
001

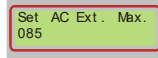
Sets the time, in minutes, that the system will remain in equalization mode after the equalize mode has been set.

AC Mbn. Present
3

NOT USED

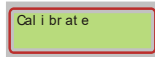


NOT USED



NOT USED

13.6




The Calibrate menu is used to setup the following parameters which relate to matching the X300 to the rectifiers, shunts and temperature probes.

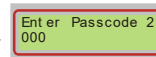
ATTENTION: X300 IS CALIBRATED AT THE FACTORY PRIOR TO SHIPPING AND UNDER NORMAL CIRCUMSTANCES DOES NOT REQUIRE REPEAT CALIBRATION.

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.

IT IS RECOMMENDED TO USE THE WEB BROWSER INTERFACE TO CHANGE PASSCODES TO AVOID IMPROPER KEY ENTRY.






Press  to access the level 2 passcode display




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

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

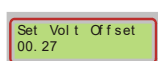
Press  or  to scroll through the Calibrate menu.

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

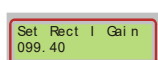
Press  to confirm.



Sets the gain of the internal A/D measuring bus voltage.



Sets the offset of the internal A/D measuring bus voltage.



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. Offst
277.0

Sets the offset (in Kelvin) of the internal A/D measuring external temperature.

Set Set point 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 Set point 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 Set point 48V
54.3

Sets the rectifier calibration point for 48V rectifiers.

Set Slope 48V
0.0672

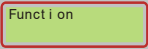
Sets the D/A slope characteristic for 48V rectifiers.

Set Passcode 1
000

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

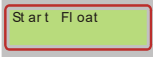
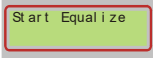
Set Passcode 2
000

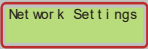
Sets the level 2 passcode to any value between 000 and 999.



- 13.7**  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.

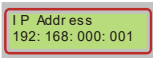
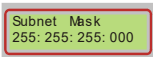
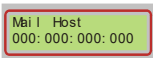
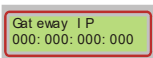
- | | |
|---|--|
|  | Sets the system into the normal float charge mode.
This is the default setting when the system is first switched on. |
|  | Sets the system into equalize charge mode.
The system will automatically return to the default Float mode when the time set for equalization in the Install menu is reached or when the Start Float function above is reset. |

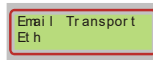
- 13.8**  The Network Settings menu is used to setup the various IP addresses required by the system to serve its WEB pages over the Ethernet TCP/IP connection.

Press  or  to scroll through the Network Settings menu.

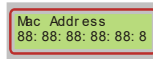
Press  to enable the set-up cursor then use the , , ,  keys to dial in the required setting.

Press  to confirm.

- | | |
|---|--|
|  | Sets the unit's IP Address.
The factory default is private address 192:168:000:200 |
|  | Sets the unit's IP Subnet Mask.
The factory default is 255:255:255:0000 |
|  | 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. |
|  | Sets the IP address for a network gateway if required.
The factory default is 000:000:000:000, not set. |



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'.



Displays the unique Mac Address identity of the Ethernet control IC installed in the X300.

14.0 LVD OPTIONS

14.1 LVD BYPASS / BATTLE SHORT

There may be situations where the operation of the LVD needs to be bypassed to prevent disconnection of the battery, even in the event of battery damage, to extend run time to the maximum the batteries can supply.

For this operation a single pole / double throw switch can be installed at the rear of the X300.

In the “OFF” position the LVD operates normally. In the “ON” position the LVD is disabled and will not open even if the LVD open voltage criteria is met.

NOTE: To prevent the LVD from opening the BYPASS MUST be engaged to the “ON” position while the bus voltage is greater than the LVD open set point. Once the LVD is open engaging the BYPASS will not close the LVD. To close the LVD a bus voltage greater than the “LVD ON” set point must be applied.

14.2 BATTERY EMERGENCY POWER OFF (EPO)

The EPO function enables the user to switch off the X300 system when already running on batteries and before the LVD has activated automatically.

For this operation a single pole switch with flying cable is connected internally to the system.

When this switch is closed the LVD contactor is opened.

15.0 USING THE CONTROLLER WEB BROWSER INTERFACE

The X300 controller 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.

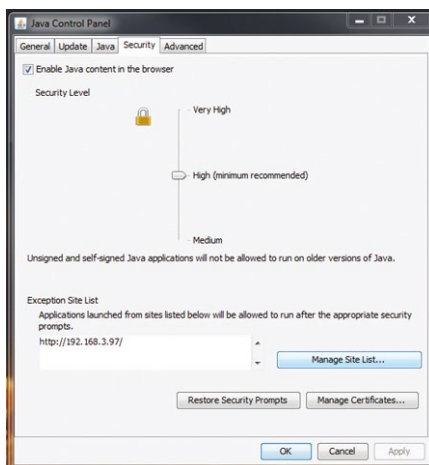
If the installed version of Java is 7u45 or earlier the following procedure “*Setting up Java*” is not required for correct operation and cannot be implemented.

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

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

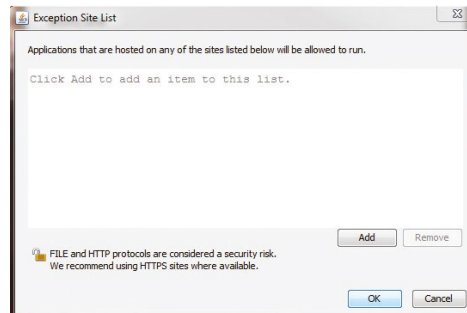
Setting up Java (7u60 or later only)

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.

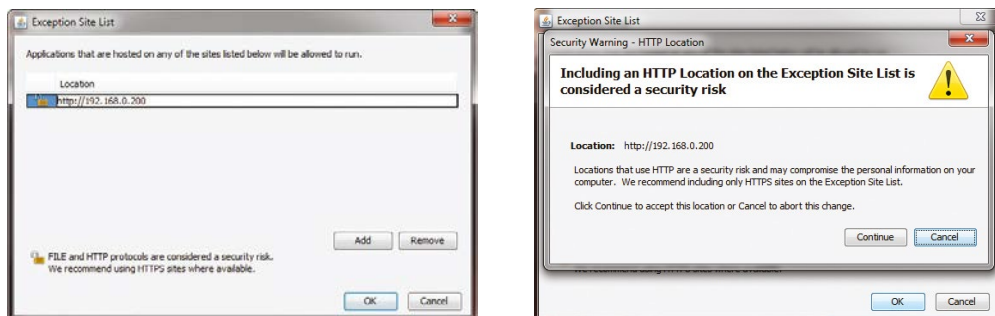


Ensure that ‘Enable Java content in the browser’ is checked and leave the “Security Level” set to “High (minimum recommended)”

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.



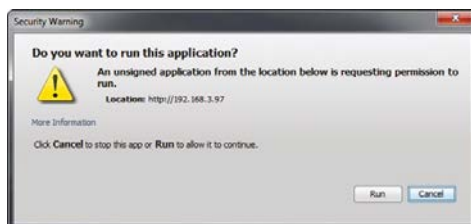
Now press OK and then OK again to close the Java control panel.

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 controller has various network programming capabilities which allow it to be connected to almost any configuration of IP network.

The default network settings that the controller 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 controller's 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 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 controller 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.

IMPORTANT NOTE: The screenshots shown throughout this section are ‘typical’ examples. The exact data content will differ dependent on the system voltage and whether alterations from the default settings have been made. Settings can be returned to the factory defaults at any time by clicking on the ‘DEFAULT’ then ‘UPLOAD’ buttons on the relevant setup page.

This action requires the level 1 password.

The factory default passwords are:

Level 1: 111

Level 2: 123

15.1 Controller Status

When the X300 is first accessed using a WEB browser the Controller Status page shown below is downloaded.

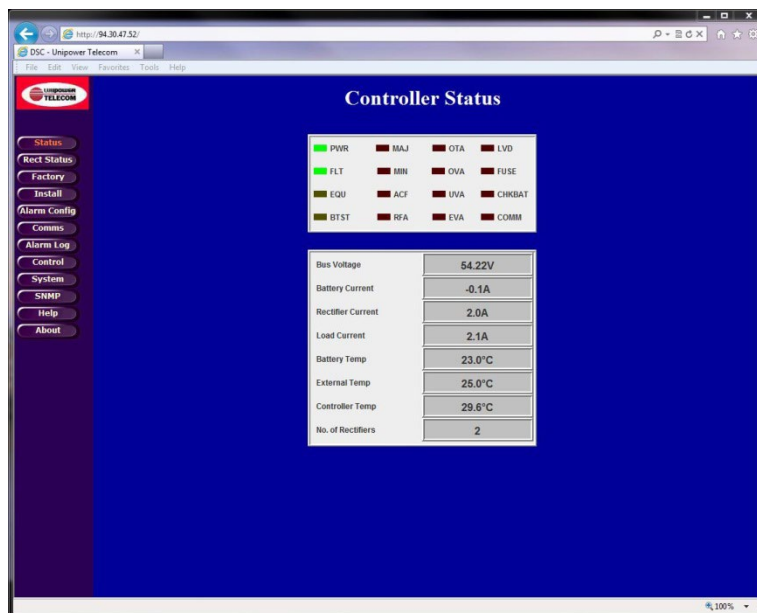


Figure 11 - Controller Status WEB Page (typical)

This page presents two blocks of information. The top block displays a number of system status parameters by mimicking a block of LEDs. 7 of these functions, described earlier, are displayed on the front panel of the system unit.

The bottom block of information shows 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.

15.2 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 controller returns the I²C address as confirmation that the unit has responded.

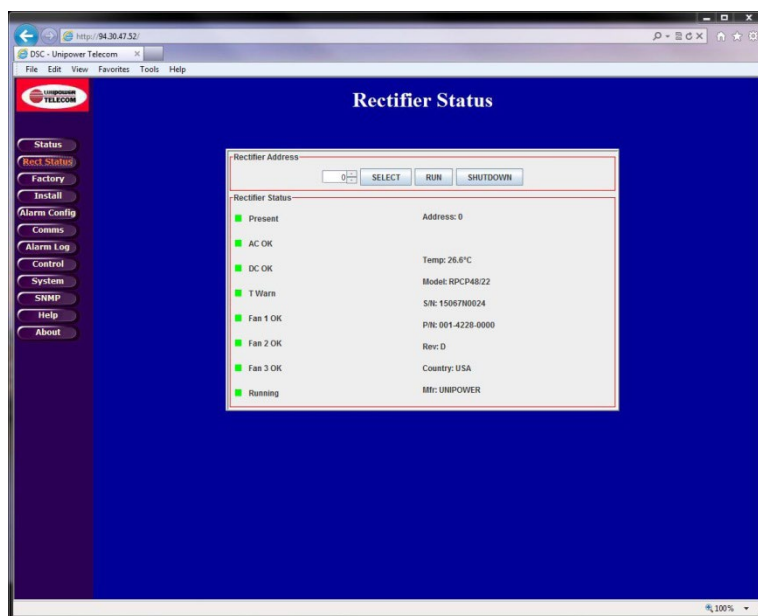


Figure 12 - Rectifier Status WEB Page (typical)

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 then click on the SELECT button to confirm the request. In an expanded system there are two rectifier shelves RS1 and RS2 (see figure 3 in section 8). In a standard system there is only RS1.

RECTIFIER I ² C ADDRESSING		
Rectifier Position	RS1 Lower	RS2 Upper
	Address	Address
Left	8	16
Center Left	9	17
Center Right	10	18
Right	11	19

Table 8 - Rectifier I²C Addressing

A few seconds after the SELECT button has been pressed the X300 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 BLUEstreak Series rectifiers include two fans only and that one of the status indicator blocks will always 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.

15.2.1 Rectifier Inhibit (Shutdown)

The X300 includes a facility that enables the user to manually inhibit or shutdown individual rectifiers. This may be desirable for energy management when the load is much lower than the number of rectifiers installed.

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.

ATTENTION: 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.

15.3 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 Pass code is presented. Once the pass code has been entered click **ENTER** and the page will then be updated with current values after a few seconds.

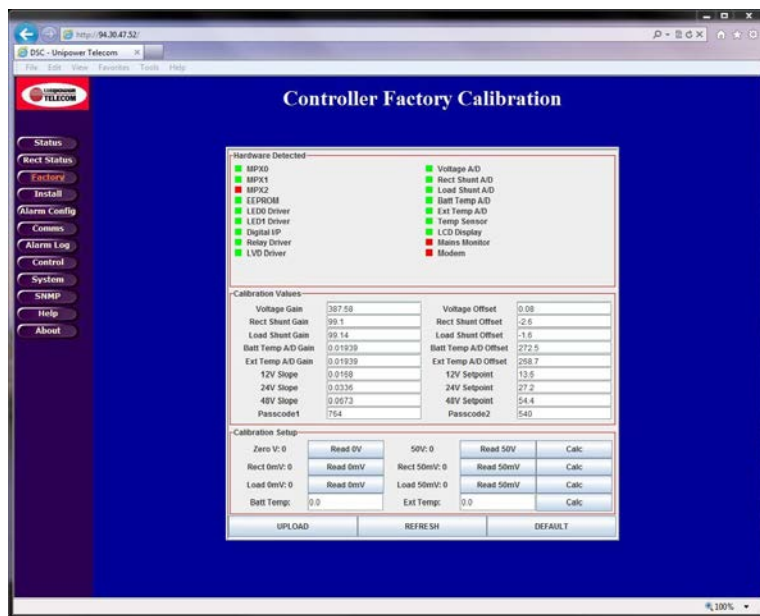


Figure 13 - Controller Factory Calibration WEB Page (typical)

NOTE: It should not normally be necessary for changes to be made to this page other than to change the pass codes if so desired.

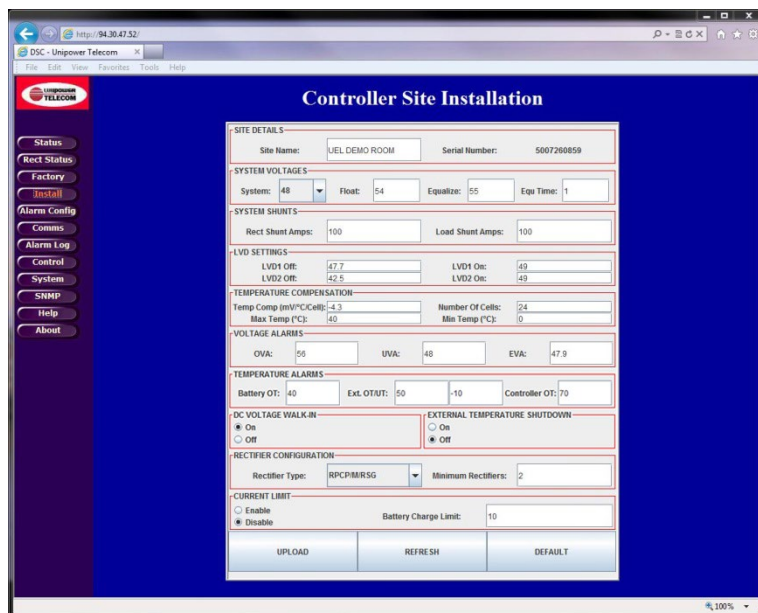
The factory default pass codes are:

Pass code Level 1 – 111

Pass code Level 2 – 123

15.4 Controller Site Installation

The *Controller Site Installation* page provides the system integrator or installer facilities for setting up the main system parameters.



The screenshot shows a web browser window displaying the 'Controller Site Installation' page. The page has a blue background and a sidebar on the left with navigation links: Status, Rect Status, Factory, Install, Alarm Config, Comm, Alarm Log, Control, System, SNMP, Help, and About. The main content area is titled 'Controller Site Installation' and contains several sections of configuration fields:

- SITE DETAILS:** Site Name: UEL DEMO ROOM, Serial Number: 500720059
- SYSTEM VOLTAGE:** System: 48, Float: 54, Equalize: 55, Eql Time: 1
- SYSTEM SHUNTS:** Rect Shunt Amps: 100, Load Shunt Amps: 100
- LVD SETTINGS:** LVD1 On: 47.7, LVD2 On: 42.5, LVD1 Off: 49, LVD2 Off: 49
- TEMPERATURE COMPENSATION:** Temp Comp (mV/°C/cell): -4.3, Number Of Cells: 24, Max Temp (°C): 40, Min Temp (°C): 0
- VOLTAGE ALARMS:** OVA: 55, UVA: 48, EVA: 47.9
- TEMPERATURE ALARMS:** Battery OT: 40, Ext OT: 50, -10, Controller OT: 70
- DC VOLTAGE WALK-IN:** On (selected), Off
- EXTERNAL TEMPERATURE SHUTDOWN:** On, Off (selected)
- RECTIFIER CONFIGURATION:** Rectifier Type: RPPC/MRSG, Minimum Rectifiers: 2
- CURRENT LIMIT:** Enable, Disable (selected), Battery Charge Limit: 10

At the bottom of the form are three buttons: UPLOAD, REFRESH, and DEFAULT.

Figure 14 - Controller Site Installation WEB Page (typical)

To retrieve the currently programmed settings from the X300 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 click on 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 X300 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 below in detail:

SITE DETAILS

<i>Site Name</i>	Optional setting which may be used to identify the location of the unit.
<i>Serial Number</i>	Displays the controller module serial number. (Cannot be changed.)

SYSTEM VOLTAGES

<i>System</i>	Dial in the Nominal BATTERY (system) voltage; 12V, 24V or 48V.
<i>Float</i>	Enter the float voltage in accordance with the specifications of the batteries that are being employed with the system.
<i>Equalize</i>	Enter the equalization voltage in accordance with the specifications of the batteries that are being employed with the system.
<i>Equ. Time</i>	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. This is a manual start function.

SYSTEM SHUNTS

<i>Rect. Shunt Amps</i>	This is the 50mV Full-Scale rating for the internal shunt that is used to measure the total rectifier current. THIS SETTING SHOULD NOT BE CHANGED.
<i>Load Shunt Amps</i>	This is the 50mV Full-Scale rating for the shunt that is used to measure the total load current. THIS SETTING SHOULD NOT BE CHANGED.

LVD SETTINGS

<i>LVD1 Off</i>	Enter the voltage at which the LVD1 contactor will open during a battery discharge. The factory default setting is that recommended for most sealed lead acid batteries.
<i>LVD1 On</i>	Enter the voltage at which the LVD1 contactor will close once bus voltage is restored. The factory default setting is recommended for most sealed lead acid batteries.
<i>LVD2 Off & LVD2 On</i>	These settings are not required for the X300.

TEMPERATURE COMPENSATION

<i>Temp Comp (mV/°C/Cell)</i>	Enter the temperature compensation slope value in accordance with the specifications of the batteries that are being employed with the system.
<i>Number Of Cells</i>	Enter the total number of battery cells. (i.e. a 48V battery enter #24)
<i>Max Temp (°C)</i>	Enter the maximum temperature at which temperature compensation may be applied. Above this temperature the X300 will cease to apply further compensation to the float voltage.
<i>Min Temp (°C)</i>	Enter the minimum temperature at which temperature compensation may be applied. Below this temperature the X300 will cease to apply further compensation to the float voltage.

ATTENTION: VERIFY THE OVA AND UVA VALUES ARE NOT EXCEEDED OTHERWISE ALARMS CAN BE GENERATED DURING TEMPERATURE COMPENSATION.

VOLTAGE ALARMS

<i>OVA</i>	Enter the voltage above which the Over-Voltage Alarm will be triggered.
<i>UVA</i>	Enter the voltage below which the Under-Voltage Alarm will be triggered.
<i>EVA</i>	Enter the voltage below which the End-Voltage Alarm will be triggered.

TEMPERATURE ALARMS

<i>Battery OT</i>	Enter the temperature at which the battery Over-Temperature alarm will be triggered.
<i>External OT/UT</i>	Enter the temperature at which the external Over-Temperature and Under-Temperature alarms will be triggered.
<i>Controller OT</i>	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 X300 controller monitors the number of installed rectifiers. When all AC power is removed the rectifier good count reaches zero and an ACF alarm is generated.

EXTERNAL TEMPERATURE SHUTDOWN

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

RECTIFIER CONFIGURATION

Rectifier Type

This selects the type of rectifier installed in the system from the drop-down list.

In the X300 this is factory pre-set to RBSR and **SHOULD NOT BE CHANGED**.

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** as required.

Battery Charge Limit

When enabled enter the maximum desired battery charge current the system can provide during a recharge cycle

Using this setting the X300 will intelligently control the rectifier float voltage such that the battery charge current never exceeds the set value.

15.5 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 auxiliary digital input.

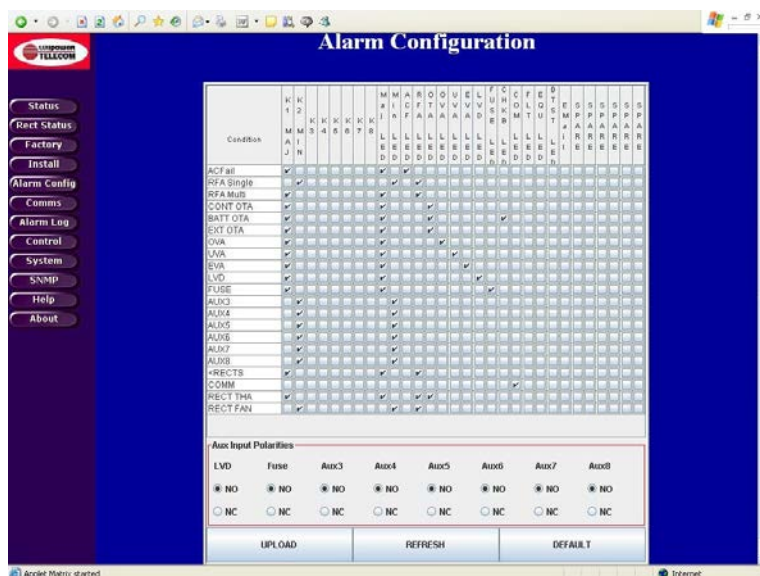


Figure 15 - Alarm Configuration WEB Page (typical)

15.5.1 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 MINOR 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 & K4 A ticked item in any of these columns will activate the relevant auxiliary alarm relay.

Note that K5 – K8 are not installed in the X300 system.

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.
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.
LVD LED	An item ticked in the column will activate the LVD LED when the condition occurs.
FUSE (CB) LED	An item ticked in the column will activate the FUSE LED when the condition occurs for a FUSE or CIRECUIT BREAKER

Note: The following LEDs are not fitted on the X300 but the function will show a valid condition on the controller status WEB page.

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

15.5.2 Aux. Input Polarities

By selecting the NO or NC radio buttons for the AUX 3 input the 'good' condition can be set to either Normally Open or Normally Closed respectively.

NOTE THAT THE LVD AND FUSE SETTINGS ARE PRESET TO N.O. AND SHOULD NOT BE CHANGED.

AUX 4 to AUX 8 are not fitted on the X300 system.

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.

15.6 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.

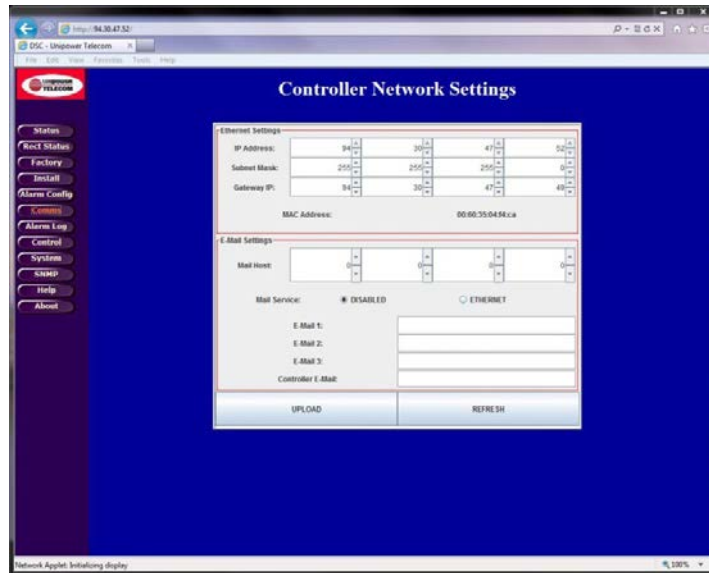


Figure 16 - Controller Network Settings (typical)

15.6.1 Ethernet Settings

15.6.1.1 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.

15.6.1.2 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.

15.6.1.3 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.

15.6.2 E-Mail Settings

15.6.2.1 Mail Host

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

To set 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.

15.6.2.2 Mail Service

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

15.6.2.3 E-Mail 1, 2 & 3

The X300 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.

15.6.2.4 Controller E-Mail

The X300 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.

15.7 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, then refresh the page click on the REFRESH button.

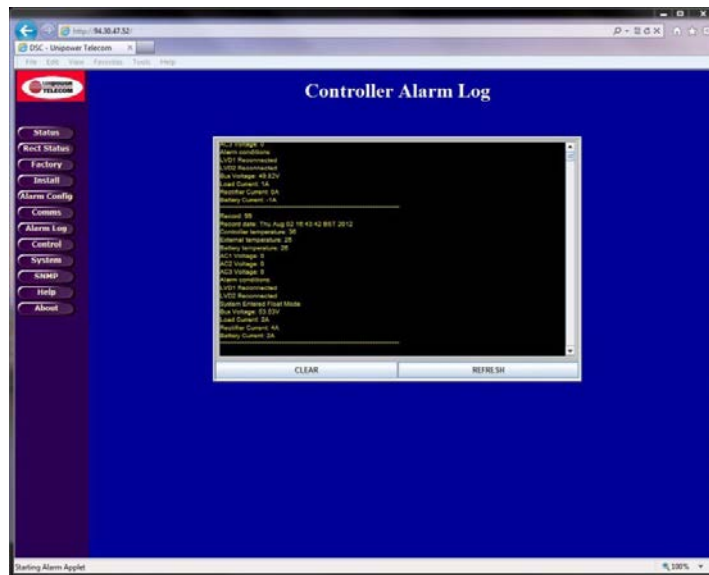


Figure 17 - Controller Alarm Log WEB Page (typical)

15.8 Control

The **Controller Control Panel** page is used to remotely switch the system between FLOAT and EQUALIZE modes. This page displays various system status functions enabling the operator to monitor these system parameters from a remote location.

To 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.

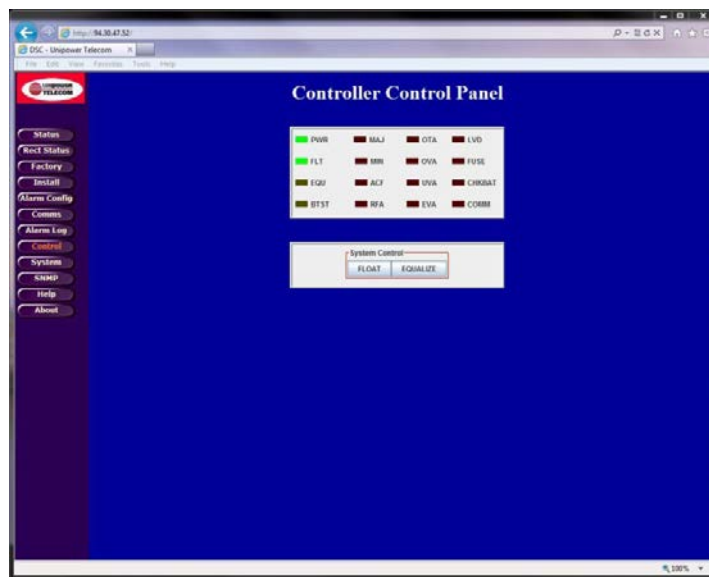


Figure 18 - Controller Control Panel WEB Page (typical)

15.9 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 synchronized with a 'host' system.

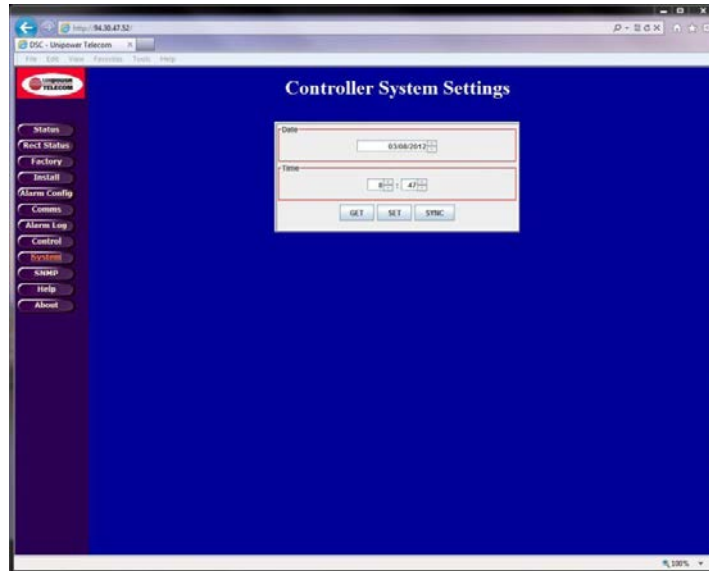


Figure 19 - Controller System Settings WEB Page (typical)

15.9.1 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.

15.9.2 Automatic Setting

To synchronize 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.

15.10 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.

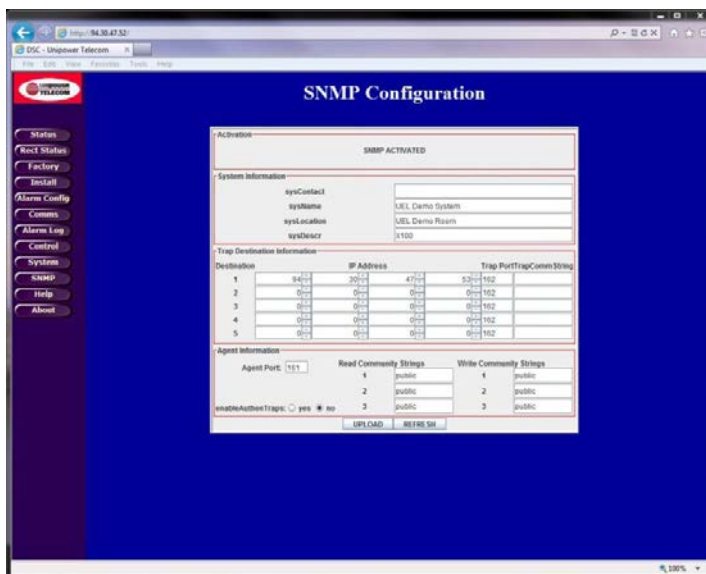


Figure 20 - SNMP Configuration WEB Page (typical)

Note: It is assumed that customers wishing to employ the SNMP features of the X300 will be familiar with the necessary set-up procedure for this page.

Note: After entering information into each of the required boxes, be sure to click on the ENTER key in each case to confirm.

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 if the SNMP feature has not been installed in the unit.

The X300 MIB, detailed in Appendix 3 of this manual is available from the software download section on the following page of the UNIPOWER web site:

www.unipowerco.com/operating-manuals

15.11 Help

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

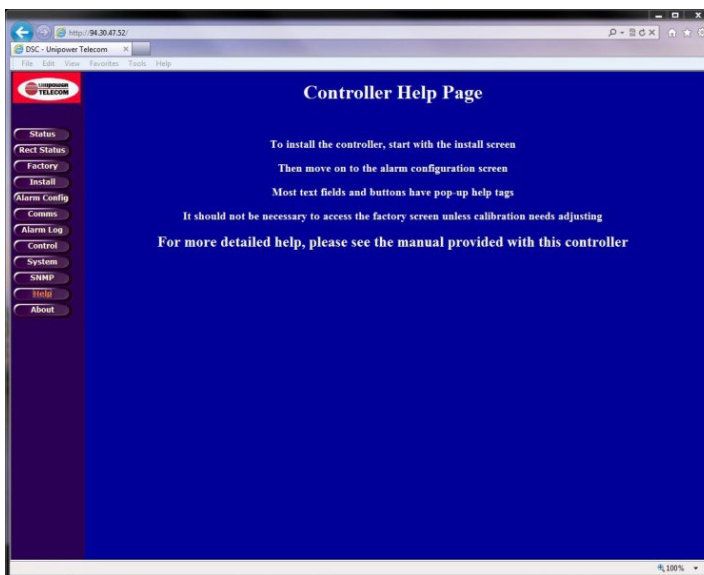


Figure 21 - Controller Help WEB Page (typical)

15.12 About

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

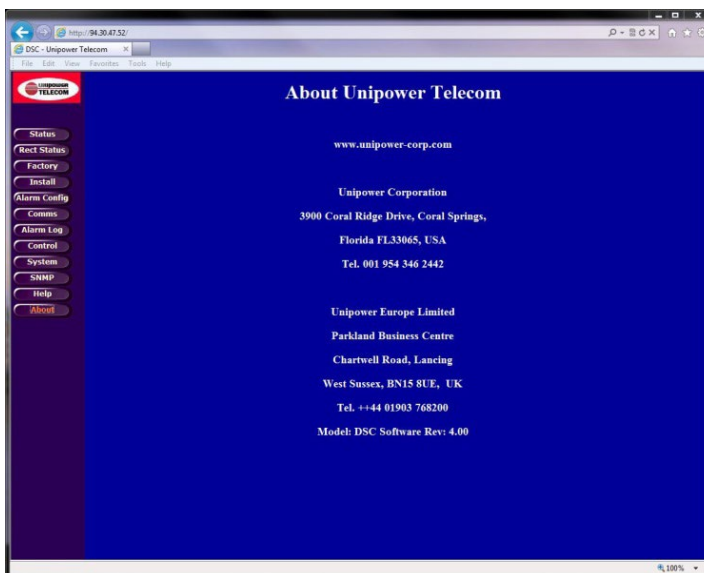


Figure 22 - About UNIPOWER Telecom WEB Page (typical)

Appendix 1 – 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 X300 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	factory set (Low Voltage Disconnect State)
Digital Input 2	factory set (Fuse/Breaker State)
Digital Input 3	USER PROGRAMMABLE or optional LVD BYPASS
Digital Input 4	NOT USED
Digital Input 5	NOT USED
Digital Input 6	NOT USED
Digital Input 7	NOT USED
Digital Input 8	NOT USED

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 X300 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 X300 MIB download it from:

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

or contact one of our sales offices.

Appendix 2 – Revision History

Rev. #	Date	Detail	Page
1	06/13	First Release	
1a	06/13	Revised Rear View- 2-post spacing added	12
2	07/13	Introduction updated Details relating to battery/load circuit breakers updated Details relating to LVD updated Details for EPO function added	4 various various 30
2a	10/13	Identify J1/J2 on rear view drawing Add detail drawing of J1/J2 adjacent to pin out tables	12 17
2b	11/13	Added wire sizes	17
3	11/13	Amended Module LED status information Added section on principal of operation Added table of available DC cables Re-order sections, renumbered and separated tables from figures	15 9 16 various
4	01/14	Add notes about Java security issues Update section 15.4 for f/w rev 4.03.	31-33 39
5	02/15	Add second note in section 5.10.	52

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