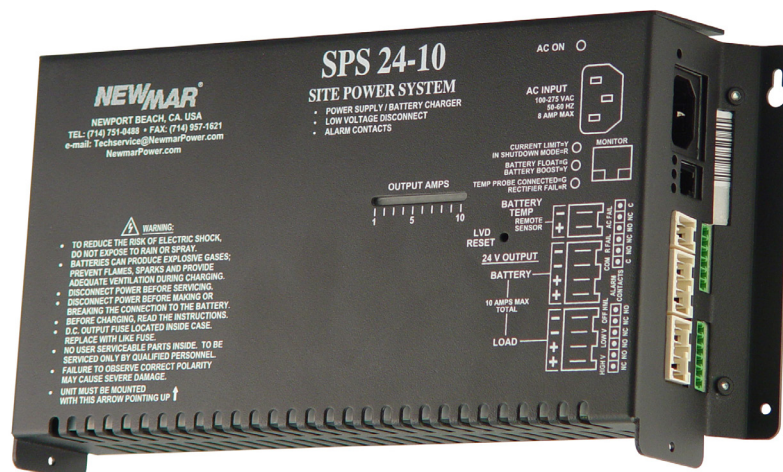


# Site Power System

## Installation/Operation Manual

Models: SPS 12-20, SPS 24-10, SPS 48-6



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Manual-SPS  
As of December 2011

# 1 Principles of Operation

## 1.1 Introduction

The SPS Series range of freestanding convection cooled wall-mount power systems consists of the following models:

Model	Input Volts	Max Input Current	Output				
			Nominal Voltage	Rated Voltage	Voltage Range	Maximum Current	Power Rating
SPS 12-20	85 - 275 VAC*	4A @ 110V 2A @ 220V	12V	14.5V	11.5-15V	20A	300W
SPS 24-10			24V	29V	22-30V	10A	300W
SPS 48-6			48V	58V	45-60V	6A	300W

\* 85 - 100 VAC: Reduced output power

The SPS units feature:

- Convection Cooling
- Thermal Protection
- Power Factor Corrected
- Input/Output Voltage and Current Protected
- Temperature Compensation
- Built in LVD - Battery Low Voltage Disconnect
- Automatic Boost/Float Charge cycle
- Active Load Sharing when operated in parallel with another rectifier
- External Alarm and Control interface
- Bar Graph Current Indicator
- Integrated Alarm Outputs

## 1.2 LEDs

There are 4 LEDs that indicate the operational state of the rectifier. These LEDs can be used to determine the present state of the rectifier and diagnose faults.

**AC On: This LED glows green to indicate that AC power is connected to the unit and that the primary stages of the rectifier are operating.**

Shutdown Mode LED:

- Yellow – Rectifier in "Current Limit"
- Red – Rectifier shutdown through over voltage or over temperature.

Float/Boost LED:

- Green – Rectifier operating in "Float Charge" mode
- Yellow – Rectifier operating in "Boost Charge" mode

Temperature Probe LED:

- Green – Temperature Compensation Probe connected and within limits
- Red – Rectifier has failed– also lights if the output voltage is externally forced above the rectifier output voltage + 4.5%. Powered from the battery. Off if the LVD has tripped.
- Note that if the Temperature Compensation Probe is connected and the rectifier fails, the LED may not show. The monitor external signals are still correct. To verify the condition, unplug the Temperature Compensation Probe.

## 1.3 Display

A row of LEDs on the front panel indicates the approximate current output from the rectifier (note only 1 LED is lit at any one time).

## 1.4 Auto Float Boost

When the SPS is powered on, it starts in Boost Charge mode. If the battery charge current is above the "Boost to Float" Current threshold, it will stay in Boost Charge mode. When the battery charge current falls below

the "Boost to Float" Current threshold for more than 10 seconds, it will switch to Float Charge mode. If for some reason the battery charge current rises above the "Boost to Float" Current threshold, the rectifier will switch back into Boost Charge mode (there is no time delay).

A Boost Timer limits the time the rectifier stays in Boost Charge mode. While the SPS is in Boost Charge mode and in Current Limit, the Boost Timer is inhibited. When the rectifier comes out of Current Limit, the Boost Timer starts and will automatically switch the rectifier into Float Charge mode after about 4 hours, even if the battery current remains above the Boost to Float Current threshold.

The Boost and Float voltages are preset in the factory but may be adjusted to suit the specific battery installation - see **Section 4.2, 4.3**.

## 1.5 Low Voltage Disconnect and Reset

The Low Voltage Disconnect (LVD) feature is designed to protect the battery from deep discharge when the battery is supplying the load current (i.e. AC is off, or the load is drawing more than the SPS capacity).

The SPS monitors the battery voltage when the battery is supplying current, and disconnects the load from the battery when the battery voltage falls to a preset level. When the battery voltage has increased above the LVD Hysteresis voltage the load is automatically reconnected back to the battery.

The LVD may be manually reset when it has operated by pressing the LVD Reset button on the front of the rectifier. The LVD switches the battery +ve supply (the -v is common with the battery). Do not connect the Battery and Load +v together.

The LVD voltage and the LVD Hysteresis voltage are preset in the factory, but may be adjusted to suit the specific battery installation - see **Section 4.7**.

Model	Voltage Adjustment	Maximum Load Current
SPS 12-20	9.5 to 12V	20A
SPS 24-10	19 to 24V	10A
SPS 48-6	38 to 38V	6A

Do not exceed the maximum load current, as the LVD circuitry may be damaged. The LVD circuitry is protected by shutting down if its circuitry is overheated due to over current conditions. Excessive overloading will cause an internal protection fuse to rupture.

If the LVD functionality is not required, then the load should still be connected to the Load connection on the rectifier, as the rectifier senses the current on the Battery connection (not the load) for the Auto Float Boost function.

## 1.6 Temperature Compensation

A temperature compensation probe with 2 meter cable and pre-attached connector is provided with the SPS.

Batteries require different charging voltages depending on the ambient temperature of the battery. The colder the battery, the higher the voltage required to charge the battery. The battery temperature is measured by connecting a Temperature Compensation Probe to one of the battery terminals. The rectifier will then automatically adjust the charging voltage.

The Temperature Compensation Slope is preset in the factory but is adjustable from 0.1% to 0.2% change in charge voltage per degree C - see **Section 4.8**.

If the Temperature Compensation Probe is not connected, then the SPS will assume a battery temperature of 25°C.

## 1.7 Current Limit

The SPS automatically limits the rectifier output current. The maximum output current is preset in the factory but may be adjusted down. See **Section 4.5**.

## 1.8 Output Over Voltage Shut Down

The SPS will automatically shutdown if the output voltage exceeds the preset value. The Over Voltage Shutdown voltage is preset in the factory but may be adjusted.

## 1.9 Input Over Voltage Shut Down

If the input voltage is outside the specified range, the SPS may shut down until the allowed voltage is restored.

## 1.10 Input Inrush Current Limiter

On startup, the peak AC inrush current is limited to twice the maximum operating current. The output voltage and current rise slowly from zero during startup, that prevents nuisance trip of input circuit breaker.

## 1.11 Over Temperature Shutdown

When the SPS reaches its maximum operating temperature, it will progressively reduce the output current to attempt to reduce the heat within the unit. In extreme circumstances, the rectifier will totally shutdown.

The maximum operating temperature range is: -10 to 70° C

## 1.12 Reverse Polarity Protection

The SPS has an internal reverse polarity protection fuse and crowbar diode fitted. These parts are not user serviceable, and the rectifier will require returning for servicing if they fail.

## 1.13 Parallel Rectifier Operation

The SPS may be connected in parallel to source more current, or to provide a degree of redundancy. The rectifiers **should** have the load share signal connected between the rectifiers. This is achieved by connecting the load share signal line on the Alarm & Control Interface port on each rectifier. The rectifiers with the higher voltage output will automatically adjust their output voltage down so that they each take a uniform share of the load.

The SPS connected in parallel must all be of the same brand and voltage rating.

## 1.14 External Shutdown

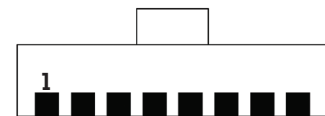
The SPS can be remotely forced to shutdown by applying a 10-12V signal to the rectifier load share pin of the Monitor connector.

## 1.15 Alarm & Control Interface

The monitor connection allows remote monitoring of the rectifier. The monitor connection is a RJ45 socket. The pinout of the socket is as follows:

Pin #	Description
Pin 1	Load Share signal (0-5V), external shutdown (10-12V in)
Pin 2	LVD Synch signal
Pin 3	Temp Comp Probe/Output Voltage Control
Pin 4	Rectifier Failed Signal – Pulls to ground via 4k7 resistor
Pin 5	-ve for Temp Comp Probe (signal Gnd)
Pin 6	Rectifier "Off Normal" alarm (open collector output)
Pin 7	+V Battery Out (max 250mA)
Pin 8	AC fail (open collector output) (off = AC present)

The open collector outputs are rated at 100V, 10mA.



Pin 1 is the left most pin, when facing the socket with the pins on the bottom.

## 1.16 Internal Alarm Card

The alarm card provides voltage free relay contacts in the event of:

- AC failure
- SPS failure
- SPS Shutdown Mode (over temperature, over voltage, current limit)
- High voltage output
- Low voltage output

When SPSs are connected in parallel using an RJ45 patch cable (Newmar part # 466-4524-0) to connect between the alarm and control interface on each rectifier, the alarm outputs on the Alarm Card give the status of all the connected units. This means that only one alarm card needs to be connected to the alarm circuitry when the rectifiers are connected in parallel.

## 2 Installation

### 2.1 General Warnings

The SPS contains no user serviceable components. Do not disassemble the SPS.

To isolate the SPS from AC power, simply unplug the IEC mains connector from the rectifier.

### **DANGER**

**Do not operate the rectifier if the covers are damaged or removed in any way.**

- **The rectifier contains voltages that may be lethal even after the input supply has been removed**
- **The rectifier contains components at High Temperatures that may burn if touched**

### 2.2 Positioning of SPS

A great deal of care should be taken with positioning the unit, as the position can affect its life expectancy and performance.

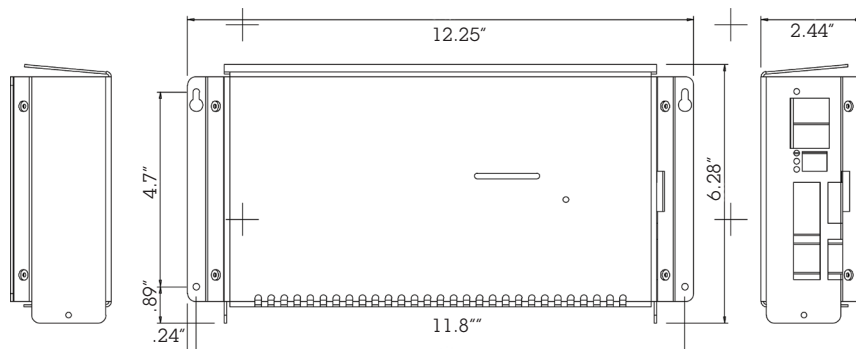
This unit **MUST** be mounted on a wall or vertical surface using the side mounts. Observe the up ^ arrow printed on the lower left of the front panel.

The SPS should be positioned close to the load and batteries, so as to keep the length of the low voltage cables to a minimum. These cables are carrying high currents, and voltage drop in the cables must be kept to a minimum. It is better to have a long AC lead and short DC voltage cables.

The rectifier must be positioned so that airflow through the rectifier is not impeded in any way. These rectifiers are convection cooled – their performance and life expectancy is reduced if the airflow is impeded.

The SPS should not be mounted above another rectifier or a source of heat.

The rectifier should be mounted 2 inches clear of any other solid object, and care should be taken to ensure that air entering the rectifier is cool air, and has not been heated by other equipment.



**Caution:**

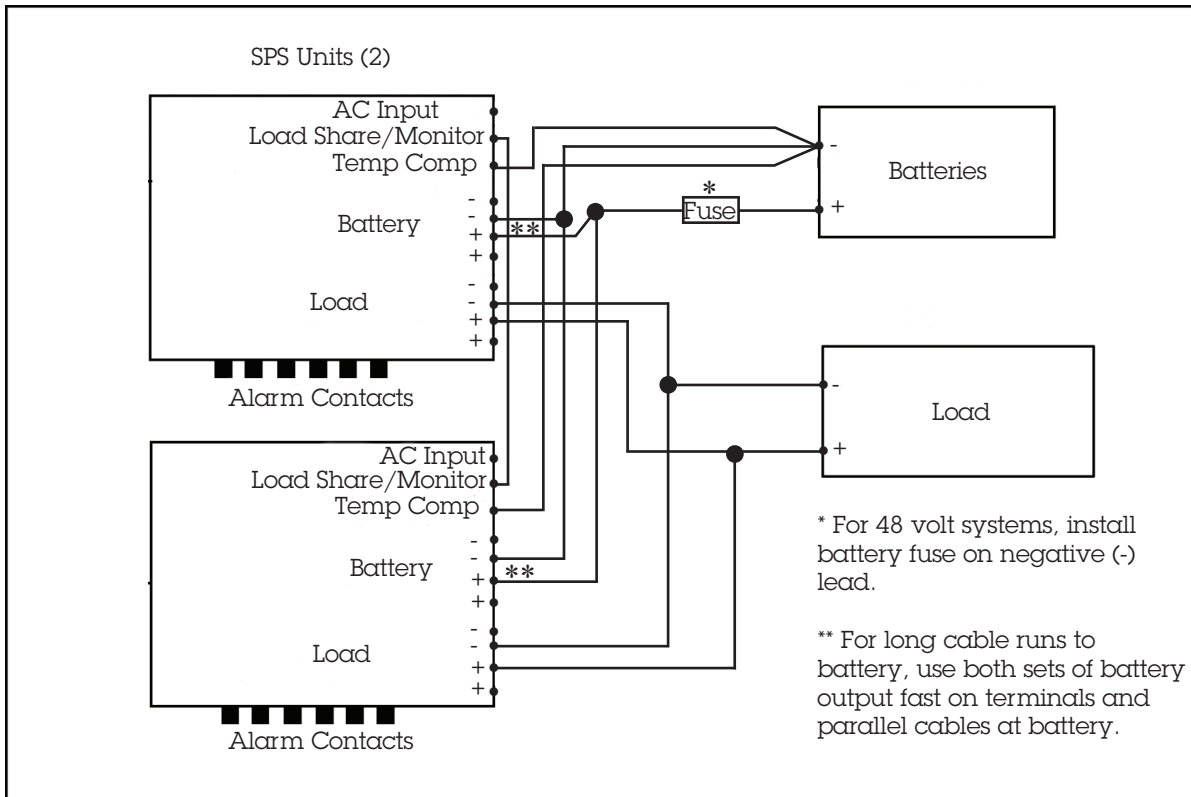
The rectifier must be mounted on a vertical surface so that it stands vertically, and is not laid flat on its side. Observe orientation arrow printed on front panel.

Do not mount rectifiers above each other.

**2.3 Cabling**

It is important that all cables (except AC) are less than 10 feet in length. The rectifier is not designed for cables greater than 10 feet or for connection to outside cables.

**Parallel/Redundant Wiring Configuration**



**AC:** The length of the AC cable to the SPS is not critical. The unit only draws 300W and they will accept a wide range of input voltages. The AC cable to the rectifier should have a disconnect switch at its supply, so the unit can be isolated for installation or servicing. It is recommended that an un-switched permanent outlet be used, so the rectifier will not be accidentally unplugged from the supply. When hard wiring AC input, the IEC AC cord provided should be wired as follows:

Input Voltage	AC Cord		
	BLK	WHT	GRN
120 VAC	L	N	Safety Ground
240 VAC	L <sub>1</sub>	L <sub>2</sub>	Safety Ground

**Load and Battery:** It is important that the lengths of these cables are kept to a minimum to reduce voltage drop. A fuse MUST be installed between the battery and the SPS, to protect the unit, load and battery. The fuse should be mounted close to the battery, and have a high rupture current capability just above the unit's capability. This fuse protects the wiring and the SPS from over current. **Note:** For 48 volt positive ground (-48V) systems, install this fuse on the negative (-) side.

If the LVD functionality is not required, the load must still be connected to the Load connection (not directly onto the battery).

It is recommended that two wires are run in parallel for both the +v and -v Battery and Load connections. 14 AWG wire should be used for the connectors. In situations where voltage drop is a concern, then a short length of 14 AWG wire should be used from the SPS, connecting to a longer length of large cross section wire.

Connectors supplied for the SPS are 4W Lumberg screw connectors. Each terminal on the connector is rated at 20 Amps at 50° C.

To connect cable to Lumberg connector, strip back cable insulation approximately 1/4", insert into connector and tighten screw.

## 2.4 Temperature Compensation

Temperature Compensation Probes are available in different lengths. The end of the Temperature Compensation Probe should be attached to a terminal on a battery (the lug is isolated, so it doesn't matter which terminal). Any excess cable should be neatly coiled. As the current in the Temperature Compensation Probe is minimal, it does not matter if the cable is longer than necessary (unlike the current carrying load and battery cables).

### Warning

**Do not reverse polarity of the cables from the battery. This will blow an internal protection fuse, requiring the SPS to be returned for servicing.**

Do not connect the Temperature Compensation Probe to the Site Power System until commissioning see **Section 2.7 - Start-Up**.

## 2.5 Multiple Units

The SPS may be operated in parallel to provide greater current capability and to provide redundancy.

When SPS connected in parallel (and load sharing), alarm outputs on the rectifiers give the status of all the units. This means that you only need to connect one alarm card to the alarm circuitry when the rectifiers are connected in parallel.

The load and battery cables should be wired in parallel to the rectifiers as per the diagram in section 2.3. Each SPS should be fitted with a Temperature Compensation Probe connected to the same terminal on the same battery.

For load and alarm sharing, an alarm and control interface cable **should** be connected to each parallel SPS to ensure that all units load share automatically. When two or more units are connected in parallel, then you can use a simple RJ45 double adaptor to daisy chain the connection cable (max 6 rectifiers).

Any fuses or circuit breakers on the output of the rectifier must be placed after the SPS outputs have been connected together.

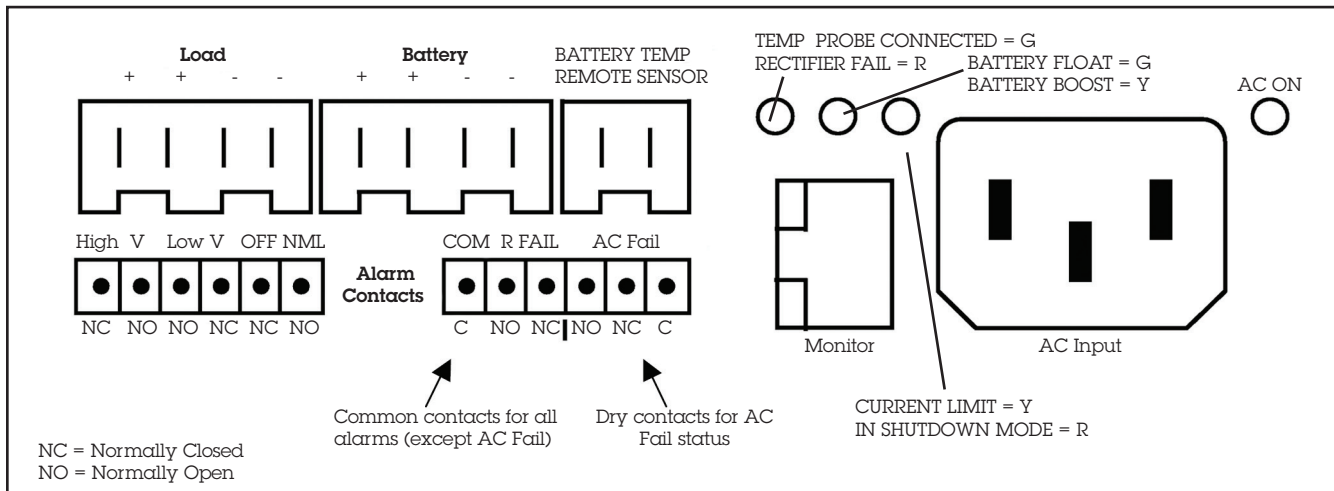
## 2.6 Internal Alarm Card

Two six position, green screw style connectors are provided for making alarm card wiring connections. The alarm card provides voltage free relay contacts in the event of:

- AC failure
- Rectifier failure
- Rectifier In Shut-Down Mode (over temperature, over voltage, current limit)
- High voltage output
- Low voltage output

When units are connected in parallel using an RJ45 cable to connect between the alarm and control interface, the alarm outputs on the Alarm Card give the status of all the connected units. This means that you only need one alarm card connected to the external alarm circuitry when the units are connected in parallel.

The diagram on the following page describes the alarm contacts found on the right side of the unit.



Refer to **Section 4.9** for information on adjusting the alarm output volt low/high settings.

### 2.6.1 Relays

The relays are Single Pole Double Throw (or changeover). Both Normally Closed (NC) and Normally Open (NO) contacts are provided. Contact rating is 100v DC, 1A max and all contacts are isolated from the rectifiers' internal circuitry. Do NOT connect AC supply to the relays.

When the SPS is operating normally (ie with no fault, or abnormal conditions) the relay outputs designated NC will be connected to the common terminal, and the relay outputs designated NO will be open circuit. Upon an alarm condition occurring the NO contacts will be connected to the common terminal, and the NC contacts will be open circuit.

The internal alarm card is powered from the batteries connected to the units. This allows the alarm card to operate correctly even when the AC power has failed.

The internal alarm card is powered from the batteries connected to the SPS. This allows the alarm card to operate correctly even when the AC power has failed.

If the rectifier does not have a battery connected and the AC fails, then the AC Fail relay still reflects the state of the AC power, however; the Rectifier Fail alarm, Rectifier Off Normal and the Low Volts alarms will also activate.

Note that the AC Fail Relay has its own "Common" connector, but all the other alarm outputs share a "Common" contact.

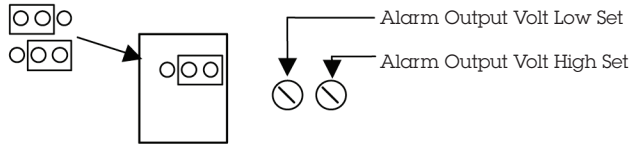
### 2.6.2 Rectifier Fail/Mains Fail

The AC Fail Alarm is activated while the mains power is not present.

The Rectifier Fail Alarm can be configured to activate when the AC has failed (as well as when the Rectifier Fails). Alternatively, the Rectifier Fail can be configured to not activate if the mains fails, so that you can remotely determine if the problem is the mains failure or a rectifier failure.

The diagram below shows the jumper configuration for AC Fail/Rectifier Fail options (opening on rear of SPS).

AC Fail = not rectifier fail  
AC Fail = rectifier fail (factory default)



### 2.6.3 Alarm Wiring in Parallel

The internal alarm cards of multiple parallel units can be connected in parallel (using RJ45 Cat. 5 style patch cord, Newmar part # 466-2524-0, 24" length) so that the alarm condition can be reported if any alarm is triggered in any SPS.

When units are connected in parallel (and load sharing), the alarm outputs give the status of all the SPSs in parallel. This means that you only need to connect one alarm card to the alarm circuitry when the units are connected in parallel.

### 2.7 Start-UP

- 1) Make sure that all cables and wires are disconnected from the SPS.
- 2) Plug the AC cable into the SPS and switch the AC on at the outlet. The AC LED should glow green.
- 3) Disconnect the mains, then plug in the Temperature Compensation Probe, re-connect AC and check that the Temperature Probe LED is green.
- 4) Disconnect the AC, then double check the polarity of the cables from the battery (there should be a fuse in the battery lead as close as possible to the battery to protect the wiring from faulty connections) and then plug them into the SPS. Re-connect the mains and the Float Boost LED should glow first yellow then after about 10 seconds either green or yellow depending on the charge of the battery. The display LEDs should give an indication of the current from the rectifier.
- 5) Disconnect the AC, then double check the polarity of the cables to the load, and then plug them into the SPS. Re-connect the AC.
- 6) If there is more than a unit connected in parallel, then follow the above procedure for each in turn (with the others all disconnected). Ensure all SPSs are adjusted to the same output voltage (better than  $\pm 0.1V$ ) Finally connect the Load Share Signal cable between the units, and check that all are indicating near equal current (should be better than 10% of full load).
- 7) Connect the alarms (if fitted/used) and check their operation.

## 3 Servicing

If the rectifier develops an operational fault or is damaged in any way, contact NEWMAR technical assistance by calling 800-854-3906 or by email: [techservice@newmarpower.com](mailto:techservice@newmarpower.com).

### 3.1 Warnings

This rectifier contains no user serviceable components. Do not disassemble the rectifier.

To isolate the unit from the AC, simply unplug the IEC connector from the unit.

## DANGER

**Do not operate if the covers are damaged or removed in any way.**

- The rectifier contains voltages that may be lethal even after the input supply has been removed
- The rectifier contains components at High Temperatures that may burn if touched

### 3.2 Troubleshooting

#### Basic operation checks:

- Check power to the rectifier – check that the AC LED is on
- Check and resolve any fault conditions indicated by the status indicators
- Check that the display is showing that it is delivering current
- Disconnect load and battery leads. Connect a load to the battery terminals. Check the voltage across the load is as expected
- Connect a current meter in series with the load. Adjust the load and check the current delivered by the rectifier is as expected

#### Load Checks:

- Connect battery but disconnect the main load to rectifier. Connect a current meter in series with the battery. Verify the current drawn by the battery from the SPS is as expected. Check that the battery takes the charge.
- Connect the DC load to the SPS with AC off and disconnect the battery. Turn AC on and check that the current drawn by the load is as expected, and within the capabilities of the SPS and battery.

#### Fine Adjustment Checks: (see Section 4 on adjustments for instructions)

- Check Boost and Float voltages
- Check Boost to Float current
- Check Temperature Compensation Slope
- Check LVD operation

### 3.3 Fuses

Although there are fuses inside the rectifier, these are rated such that their failure indicates a fault requiring qualified service. Do not attempt to replace these fuses.

However for IEC 60950 the fuse ratings are required to be specified. The following fuses are soldered to the PCB:

- FH101 – 125mA 250V ETF Bussmann

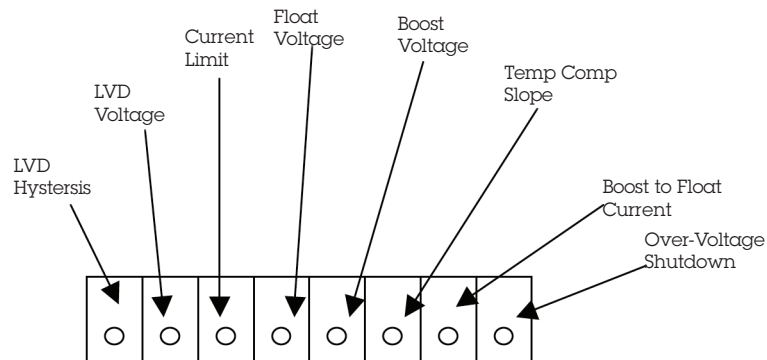
Model	FH1, FH2	FH200, FH401	FH201, FH402
SPS 12-20	5A 250V ceramic slow blow	40A 32V Blade	-
SPS 24-10	5A 250V ceramic slow blow	40A 32V Blade	-
SPS 48-6	5A 250V ceramic slow blow	40A 58V Blade	-

## 4 Adjustments

The SPS is supplied from the factory with all the adjustments set for normal operation. These settings are detailed below. A competent technician only should adjust these settings.

To adjust the settings, appropriate test equipment is necessary (depending on the adjustment). A variable load, a variable DC power supply, and an accurate voltage and current meter are required. The SPS should be unscrewed from its mounting. The SPS must be disconnected from the battery and load. The adjustment trimpots are accessible on the rear side of the rectifier. **4.1 Standard Settings**

Item	SPS 12-20	SPS 24-10	SPS 48-6
Boost Voltage	14.2V	28.8V	57V
Float Voltage	13.7V	27.4V	54V
Boost to Float Current	2A	1A	0.5A
Over Voltage Shutdown	16V	32V	60V
Temp Comp 25° C	13.7V	27.4V	54V
Temp Comp 5°	14.06V	28.32V	55.9V
LVD On Voltage	12V	24V	48V
LVD Off Voltage	10V	20V	40V
Current Limit	20A	10A	6A



#### 4.2 Adjust Float Voltage

Connect a variable load (set to minimum load) to the battery connections of the rectifier. Disconnect the Temperature Compensation Probe. Connect an accurate voltmeter across the load. Turn on AC to the unit. Wait approximately 10 seconds for it to switch back to Float Charge mode. Check that the LEDs indicate Float Charge mode.

Adjust the Float Voltage trimpot to set the required float voltage.

#### 4.3 Adjust Boost Voltage

Connect a variable load (set to minimum load) to the battery connections. Disconnect the Temperature Compensation Probe. Connect an accurate voltmeter across the load. Turn on AC to the unit and adjust the load until the unit goes into Boost Charge mode (as indicated on the LEDs).

Note that there is a 10 second delay when switching from Boost Charge mode to Float Charge mode, but no delay when switching from Float to Boost.

Adjust the Boost Voltage trimpot to set the required boost voltage.

#### 4.4 Adjust Boost to Float Current Threshold

Connect a variable load (set to minimum load) to the battery connections of the SPS. Disconnect the Temperature Compensation Probe. Connect an accurate current meter in series with the load. Turn on AC to the unit, wait 10 seconds and then adjust the load up slowly until the unit goes into Boost Charge mode (as indicated on the LEDs). Slowly decrease the load until the rectifier switches to Float Charge mode.

Note that there is a 10 second delay when switching from Boost Charge mode to Float Charge mode, but no delay when switching from Float to Boost.

Adjust the Boost to Float Current trimpot to set the required current value (0.1A to 40% of full load).

#### 4.5 Adjust Current Limit

Connect a variable load (set to minimum load) to the load connections of the SPS. Disconnect the Temperature Compensation Probe. Connect an accurate current meter in series with the load. Turn on AC to the rectifier and adjust the load until the rectifier goes into current limit (as indicated on the LEDs).

Adjust the Current Limit trimpot slowly to set the required current limit. Do not exceed 100% of the rated current. Note that the current output requires time to settle when you adjust the trimpot.

#### 4.6 Adjust Over-Voltage Shutdown

This adjustment requires a variable voltage power supply (that has a maximum voltage exceeding the over-voltage value to be set).

Connect the variable voltage power supply across the load connections of the SPS (ensure that +v output of the variable supply is connected to the +v load connection). Disconnect the Temperature Compensation Probe. Connect an accurate voltmeter across the output. Turn the mains on to the rectifier and adjust the variable voltage power supply up until the unit goes into over-voltage shutdown (as indicated on the LEDs).

Adjust the Over-Voltage Shutdown trimpot to set the required voltage limit. Note that the SPS will cycle on and off – this is normal.

#### 4.7 Adjust Low Voltage Disconnect and Hysteresis

This adjustment requires a variable voltage power supply (that has a maximum voltage exceeding the voltage value to be set).

Connect the variable voltage power supply across the battery connections of the rectifier (ensure that +v output of the variable supply is connected to the +v battery connection). Connect an accurate voltmeter across the load connections of the rectifiers.

Leave the rectifier disconnected from the AC. Switch on the variable power supply and adjust the voltage up until there is voltage on the load connections. Adjust the variable voltage down slowly until the load voltage drops suddenly, indicating the load has been disconnected.

First - Adjust the LVD Voltage trimpot to set the required 'on' voltage limit.

Second - Adjust the LVD Hysteresis trimpot to set the required 'off' voltage limit.

#### 4.8 Adjust Temperature Compensation Slope

The rectifier assumes that the battery temperature is 25°C when the Temperature Compensation Probe is not connected. Disconnect the Temperature Compensation Probe, and adjust the boost and float charge voltages to that required for 25°C. Reconnect the Temperature Compensation Probe and cool the metal lug to 0°C (using a container containing ice and water - **do not** immerse the probe in the water as it is not waterproof).

Adjust the Temperature Compensation Slope to set the required charging voltage at this temperature as determined by the manufacturer's specification.

#### 4.9 Adjusting the alarm output volt low/high setting

See diagram with **Section 2.6.2.** - Rectifier Fail/AC Fail.

The High Volts and Low Volts Alarm Thresholds can be adjusted to suit the application. This adjustment requires a variable voltage power supply (that has a maximum voltage exceeding the over-voltage value to be set).

Connect the variable voltage power supply across the load connections of the SPS (ensure that +v output of the variable supply is connected to the +v load connection). Disconnect the Temperature Compensation Probe. Connect an accurate voltmeter across the output. Turn AC and adjust the variable voltage power supply up until the alarm activates. Adjust the 'Alarm Output High' trimpot to adjust the alarm limits. Use the same procedure to adjust the 'Alarm Output Low' limits.

#### 5 Optional Accessories

**Rackmount Kit:** Model RM-SPS

**DIN-Rail Kit:** Contact Factory

#### 6 Warranty and Factory Contact Information

Newmar warrants that Site Power System be free from defects in material and workmanship for two years from date of purchase. If a problem with your SPS, or if you have any questions about the installation and proper operation of the unit, please contact NEWMAR's Technical Services Department:

Phone: 714-751-0488 - From the hours of 7:30 a.m. to 5:00 p.m. weekdays, P.S.T.

Fax: 714-957-1621

E-mail: [techservice@newmarpower.com](mailto:techservice@newmarpower.com)

7 Dimensional Drawings

