

SWITCH MODE DC POWER SUPPLY



REGULATED DC POWER SUPPLY

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**MODELS:   SEC-1235**  
**SEC-1235M**

INSTALLATION & OPERATING MANUAL

**Please read this manual before operating your power supply.**

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## CAUTION !



**RISK OF ELECTRIC SHOCK  
DO NOT OPEN**



**WARNING—TO REDUCE THE RISK OF FIRE OR ELECTRIC SHOCK, DO NOT EXPOSE THIS APPLIANCE TO RAIN OR MOISTURE. THERE ARE NO USER SERVICEABLE PARTS INSIDE—REFER TO QUALIFIED SERVICE PERSONNEL.**

### **IMPORTANT SAFETY INSTRUCTIONS**

Please read before using your power supply.

- 1) It is recommended that you return your power supply to a qualified dealer for any service or repair. Incorrect assembly may result in electric shock or fire.
- 2) To reduce the risk of electric shock, unplug the power supply from the outlet before attempting any maintenance or cleaning. Turning off controls will not reduce this risk.
- 3) If an extension cord is used, make sure that it has 3-prong, grounded male plug (NEMA5-15P) and 3-prong, grounded female receptacle (NEMA5-15R). The size of the current carrying conductors should be such that they are able to carry at least 10 A for the length of the extension.
- 4) Place the unit in an area that will allow air to flow freely around the unit. DO NOT block or obstruct vent openings on the side/bottom of the unit.
- 5) Keep the unit away from moisture and water.
- 6) **NEVER OPERATE THE UNITS IN PARALLEL**

**WARNING!** Your power supply should be grounded to reduce the risk of electric shock. The power supply comes with a detachable power cord that has a 3 prong, grounded male plug (NEMA5-15P). The round prong of the plug gets connected to the chassis of the unit. When the power cord is plugged into the corresponding 3 slot female receptacle (NEMA5-15R), the chassis of the unit is automatically connected to the earth ground through the equipment grounding conductor that is connected to the round slot of the female NEMA5-15R receptacle.

The power cord must be plugged into a NEMA5-15R outlet that is properly installed and grounded in accordance with all local codes and ordinances. Never alter the power cord that has been provided. If the plug of the cord will not fit the outlet, have a proper outlet installed by a qualified electrician. Improper connection can result in risk of electric shock.

**DO NOT USE THE POWER SUPPLY FOR DIRECT CHARGING OF BATTERY OR DIRECT CONNECTION TO A BATTERY FOR BATTERY BACK-UP. ( Please read the section on “Battery Charging and Battery Back-up” on page 5).**

## DESCRIPTION

SEC-1235 / SEC-1235M are Switched Mode Power Supplies (SMPS) which convert 120 VAC, 60 Hz (or 230 V, 50 / 60 Hz \*) AC power to regulated 13.8 V DC power based on Pulse Width Modulation (PWM) control.

**\*Note:** *The units are factory preset to operate from an input voltage of 120 VAC, 60 Hz. These may be set to operate from an input voltage of 230 VAC, 50 / 60 Hz. by changing internal settings as described below under "OPERATION FROM AC INPUT OF 230 VAC"*

## FEATURES

- Based on switched mode technology and PWM control
- Compact and light weight
- High efficiency and less heat dissipation
- SEC-1235M comes with voltmeter and ammeter
- Protected against short circuit, over load and over temperature
- Cooling by temperature controlled fan
- UL safety certified and listed under UL Standard UL60950-1 for Information Technology Equipment Power Supply
- Complies with FCC Part 15(B) for limits on EMI for Class B Digital Devices

## OPERATION FROM AC INPUT VOLTAGE OF 230 VAC

These units have been preset to operate from an input voltage of 120 VAC, 60 Hz. The units can be set to operate from an input voltage of 230 VAC, 60 Hz. by changing the position of an internal jumper. The procedure for conversion to input voltage of 230 VAC, 50 Hz. is as follows:

- Switch off the unit and unplug the power cord from the AC outlet
- Remove the top cover
- For 120 VAC operation (pre-set condition), points "D" and "E" on the printed circuit board (PCB) have been connected (shorted) with a flexible wire jumper. To convert to 230 VAC input, disconnect the quick disconnect connector at point "D" by pulling it upwards. Tape this end with an insulation tape and use a cable tie to tie it securely to the wire harness running above
- The fuse on the AC side for the preset input voltage of 120 VAC is rated at 250 V, 8 A. For 230 VAC operation, the fuse has to be rated at 250 V, 4A. Replace the existing 8 A fuse with a 4 A fuse. See under "SPECIFICATIONS" on page 11 for details on the 4 A fuse.
- The detachable power cord that is provided has an "IEC 320-13" female connector on one end that will mate with the "IEC 320-C14" male AC inlet connector on the power supply. The other end of this power cord has a 120 VAC NEMA5-15P plug meant for connection to the 120 VAC, NEMA5-15R outlet. For operation on 230 VAC, 50 Hz, a different detachable power cord will have to be used. Use an appropriate power cord that has an "IEC 320-13" female connector on one end (for connection to the "IEC 320-C14" AC inlet connector on the power supply) and a 230 VAC plug on the other end corresponding to the 230 VAC outlet. Please ensure that the new 230 VAC power cord uses two pole, 3 wire grounding configuration (this will ensure proper earth grounding).

## CONNECTION AND OPERATION

**WARNING !** The unit has been pre-set to operate from an input voltage of 120 VAC. Hence, before plugging the unit to the AC outlet, please ensure that the local AC power supply voltage is 120 VAC. Operation from 230 VAC is possible by changing internal settings. Please see details on page 3 under "OPERATION FROM AC INPUT VOLTAGE OF 230 VAC"

**NOTE:** The DC output connectors (RED + and Black -) have a tubular hole of diameter 0.2" (5mm) with a set screw. If bare wire with stranded conductors is used to connect the load to the above output connectors of the power supply, the strands will spread out as the set screw is tightened and hence, the set screw will not pinch all the strands. As a result, the effective cross section of the current conducting area of the wire will be reduced resulting in voltage drop at the load end, reduced efficiency and also overheating. For a firm connection, crimp / solder a suitable pin type of copper terminal on the wire end to be connected to the power supply. **For convenience, a pair of terminals has been provided for crimping / soldering to the wire end.**

### OPERATION

- Ensure that the on / off switch on the power supply is switched off and it is un-plugged from the AC outlet
- Switch off the 12 V load to be connected to the power supply. Connect the positive input wire of the load to the RED (Positive) terminal of the power supply and the negative input wire of the load to the BLACK (Negative) terminal of the power supply. Ensure that the connections are secure and tight
- Plug the power supply into the AC outlet. Press the On / Off switch of the power supply to the On position and check that the switch is illuminated indicating availability of the AC input power. If the On / Off switch is not illuminated, recheck the AC input connection, AC outlet and the fuse inside the power supply.
- The voltmeter on SEC-1235M will read 13.8 V.
- Now switch on the DC load
- The ammeter on SEC-1235M will indicate the current drawn by the load
- Ensure that the continuous load is limited to 30 A

## COOLING FAN CONTROL / THERMAL PROTECTION

**WARNING!** Operate the unit in a well ventilated, open and cool area. Do not block the openings at the fan discharge on the bottom of the unit and the suction openings on the sides.

The units are cooled by convection and by forced air cooling. **A temperature controlled fan** has been provided to improve cooling at higher loads and at higher ambient temperatures. The switching on of the fan is controlled by a sensor mounted on the power transformer. The fan will be switched on when the temperature of the sensor reaches 60° C +/- 5° C. The fan will be automatically switched off when the sensor cools down to 50° C +/- 5° C. **Thus, at lower loads or during lower ambient temperatures, the fan may remain switched off.**

An additional protection is provided to shut down the power supply in case the fan fails or if the air flow is blocked or if the ambient temperature is very high. A second temperature sensor is also mounted on the power transformer and will activate at 105° C +/- 5° C and shut down the output of the power supply. After the power supply cools down to 95° C +/- 5° C, the temperature sensor will deactivate and the power supply will resume operation automatically

## ADJUSTING OUTPUT VOLTAGE

The output voltage can be adjusted with the help of the internal potentiometer marked "VR2". Adjustment range is (11V to 16 V).

**WARNING!** At output voltages higher than 13.8 V, the maximum output current should be reduced linearly from 30 A at 13.8 V to 25 A at 16 V.

## PROTECTIONS

### OVERLOAD / SHORT CIRCUIT

The units are protected against overload by constant current limiting at 35 A. If the load tries to draw more than 35A, the output voltage will drop and will no longer be regulated. The output voltage will drop to near 0 V in case of a dead short. The unit will recover automatically once the overload condition is removed.

### OVER TEMPERATURE

Protection is provided to shut down the power supply in case the fan fails or if the air flow is blocked or if the ambient temperature is very high. A temperature sensor is mounted on the power transformer and will activate at 105° C +/- 5° C and shut down the output of the power supply. After the power supply cools down to 95° C +/- 5° C, the temperature sensor will de-activate and the power supply will resume operation automatically

## BATTERY CHARGING AND BATTERY BACKUP

**WARNING!**      **These units are power supplies and not battery chargers.  
Do not connect these units directly to a battery**

The voltage of a 12 V battery in a deep discharged condition will be around 10 to 11.4 V. When a deeply discharged 12 V battery is charged at say 13.8 V, it will initially draw a very large current. As the battery capacity is restored, the battery voltage increases to around 13.8 V when fully charged and the current drawn by the battery reduces a few hundred mA.

If a deeply discharged battery is directly charged by SEC-1235 / SEC-1235M, the battery will initially draw a very large current and thus, will force the power supply into current limit mode for prolonged period of time. This is harmful for the power supply as operating under prolonged periods under current limit conditions is an abnormal operating condition. SEC-1235 / SEC-1235M may be used for battery charging and battery backup application only when the battery is charged through a suitable external isolating diode and charge limiting resistor in series with the power supply. The isolating diode will ensure that the battery does not feed power back into the power supply and the series connected charge limiting resistor will limit the maximum charging current to a value less than the current limit.

It is recommended that the optional Battery Backup Module BBM-12100 may be used in conjunction with the power supply for battery charging / backup application.

**Call Technical Support at 1-800-561-5885 for further assistance**

## TROUBLESHOOTING - GENERAL

### **PROBLEM : Power ON/OFF switch does not illuminate when turned on.**

#### PROBABLE CAUSE

No power in the AC outlet

AC side fuse inside the power supply is blown

#### SUGGESTED REMEDY

Check there is power in the outlet.

Replace the fuse inside the unit.  
See fuse ratings at page 11

### **PROBLEM : AC side fuse blows as soon as power is turned on.**

#### PROBABLE CAUSE

Unit is defective

#### SUGGESTED REMEDY

Call technical support.

### **PROBLEM : The output voltage is 0 V or very low**

#### PROBABLE CAUSE

Input voltage is very low

The unit is in current limit condition due to overload caused by large reactive loading or by the output being short circuited

Unit is shut down due to over temperature.

#### SUGGESTED REMEDY

Check that the input voltage is 120VAC

Check the output terminals are not shorted. Remove the load. If the output voltage gets restored, the load is shorted or is offering large reactive impedance.

Check that the fan has not failed or the vent openings are not blocked

### **PROBLEM : Output voltage drops as soon as the load is switched on**

#### PROBABLE CAUSE

The unit is going into current limit protection mode

#### SUGGESTED REMEDY

Reduce the load current to less than the current limit value. Motors, pumps, compressors, relays, incandescent and halogen lamps and large capacitors in the input section of the DC devices draw very high inrush or starting currents of up to 10 times their normal operating currents. Ensure that these inrush/starting currents are below the current limit value of the power supply.

## LIMITING ELECTROMAGNETIC INTERFERENCE (EMI)

This equipment has been tested and found to comply with the limits for a class B digital device, pursuant to Part 15(B) of the FCC Rules. These limits are designed to provide reasonable protection against a harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, this does not guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio / TV technician for help.



## SWITCHING POWER SUPPLIES AND RF NOISE

1. Switched mode power supplies ( SMPS ) employ high frequency switching and thus, are a source of radio interference, a recipient of radio interference and a conduit of radio interference. ( Older linear type transformer based power supplies do not employ high frequency switching voltages and will be quieter as compared to switching type of supplies ).
2. The primary emission sources originate in the switching devices due to their fast switching current transitions: harmonics of the switching frequency and broadband noise created by under-damped oscillations in the switching circuit. The secondary source is from the bridge rectifier, both rectifier noise and diode recovery. The AC input rectifier / capacitor in the front end of the switching power supplies ( excepting those with power factor correction ) are notorious for generating power supply harmonics due to the non linear input current waveform. The noise is both conducted and radiated through the input power cord and the DC output wiring to the radio.
3. Switching power supplies are also recipients of radio interference. The normal operation of the power supply can be disturbed due to RF noise getting coupled into the power supply. Thus, the power supply may generate excessive RF noise and lose output voltage regulation due to excessive transmitter energy being coupled through the AC / DC lines to the power supply's regulator feedback path. This may be due to antenna being too close or due to the antenna or feed system not radiating properly. First check the antenna system SWR. Then, if necessary, relocate either the antenna or the power supply farther apart.

4. The receiver may “hear” the power supply. A slowly moving, slightly buzzing carrier heard in the receiver may be caused by the antenna being too close. As with the transmitter related noise pick up, a loose coaxial connector or a broken or a missing ground may aggravate this problem. Normally these noises will be below the background or “band” noise. Increase the separation between the power supply and the receiving antenna. Use an outdoor antenna. This will reduce the amount of signal picked up from the power supply and also increase the amount of the desired signal.

5. The conducted and radiated noises are limited as per the applicable national / international standards. In North America, the applicable standard is as per FCC Part 15(B) for Class “B” digital devices. The European standard is as per EN55022, Class “B” & EN61000-3-2, 3. **Thus, the RF interference is limited but not entirely eliminated.**

6. The conducted RF noise from these power supplies is limited to the maximum allowable levels by internal filtration. The filtered RF noise currents (normally < 5mA ) are bypassed to the chassis of the power supply. The chassis is, in turn, connected to the earth ground pin of the AC input power cord (for Class 1 units). Thus, the filtered noise currents are intentionally leaked to the earth ground. This is termed as the “Earth Leakage Current”. For safety against electric shock, this earth leakage current is also required to be limited. It will be seen that these two requirements are conflicting.


***NOTE: In some cases, to prevent electric shock hazard due to abnormal leakage current (like in marinas, spas, hot tubs, wet spaces etc.), the AC outlet circuits / receptacles in these areas are served through a GFCI (Ground Fault Circuit Interrupter ).*** This GFCI is normally set to trip when it senses an earth leakage current > 5 mA. A single GFCI may be serving multiple AC outlet circuits / receptacles and therefore, will be sensing the sum of all the leakage currents of the devices connected to these. As the switching power supplies have intentional leakage current as explained above, it may trip a GFCI feeding multiple AC outlet circuits / receptacles. In such cases, disconnect devices connected to the other AC outlet circuits / receptacles served by this GFCI.

7. Following additional guidelines may be followed to reduce the effects of RF noise:

- a. Use additional appropriate AC radio frequency interference (RFI) power line filter rated for minimum 10 A immediately before the AC input of the power supply. For example, consider suitability of model # 10VN1 from "N" series by Corcom, Inc. ([www.cor.com](http://www.cor.com)) or similar. Filtered, ferrite coated cord set ([www.emceupen.com](http://www.emceupen.com)) is another choice. These cord sets, with integral line interference filters, reduce common and differential mode interferences over a wide frequency range. Because they are shielded, they are also effective against radiated interferences. In addition to the built-in filter networks, the cable conductors are coated with an RF absorbing ferrite compound. This provides additional attenuation at high frequencies that is lacking in most regular LC filters. The RF absorption of the ferrite-coated cable avoids resonances at high frequencies, reducing the conducted and radiated RF noises even further
- b. Use additional appropriate DC radio frequency interference (RFI) power line filter rated for minimum 40 A immediately after the DC output of the power supply. For example, consider suitability of model # "FD10B050" from "FD" series by Curtis Industries ([www.curtisind.com](http://www.curtisind.com)) or similar.
- c. Twist the positive and negative wires from the output of the power supply to the radio
- d. The DC side positive and negative outputs of these power supplies are isolated from the chassis. As explained at paragraph 6 above, the noise currents are filtered to the chassis ground and the chassis ground is connected to the earth ground through the earth ground pin of the AC power outlet receptacle. Avoid connecting (referencing) the DC negative output terminal of the power supply to the earth ground.
- e. Connect a 1/4" wave length of wire on the negative terminal of the power supply. Connect one end of the wire to the negative terminal and leave the other end free. The wave length corresponds to the wave length of the interfering frequency. (May not be practical for long wave lengths)

[ Formula: Wave length (Meters) = 300 / frequency in MHz ]

## SPECIFICATIONS

Model Nos.	SEC-1235	No meters
	SEC-1235M	With Voltmeter and Ammeter
Nominal Input Voltage	120 VAC, 60 Hz (100 VAC to 130 VAC) – Factory preset 230 VAC, 50 Hz / 60 Hz (200 VAC to 260 VAC) – By internal setting	
Input current	7.5 A at 120 VAC, 60 Hz 3.5 A at 230 VAC 50 / 60 Hz.	
Output Voltage	13.8 VDC	
Output voltage adjustment	11.5 V to 15.5 V with the help of internal potentiometer	
Output current	30A continuous	
Current limit	35A, constant current limiting, auto recovery	
No load current draw	120 mA at 120 VAC	
Ripple	50 mV peak to peak	
Noise	150 mV peak to peak	
Peak Efficiency	85%	
Cooling	Temperature controlled fan	
Output indications	Voltmeter and Ammeter (only for SEC-1235M)	
Protections against	Overload, short circuit Over temperature	
Operating temperature	0° to 40° C	
Safety Certification	 UL60950-1, E179076	
EMI (Emissions) compliance:	FCC Part 15 (B) for Class B devices	
AC input connections	Male AC inlet connector Type "IEC 320-C14" Detachable AC power cord with: - Female connector Type "IEC 320-C13" on one end to mate with AC power inlet connector on the power supply - Male, 2 pole 3 Wire grounding (3 prong) plug Type "NEMA5-15P" on the other end for connection to the AC outlet.	
DC output connections	RED (+) and BLACK (-) terminals with tubular hole and set screw. Hole diameter 0.2", (5 mm). Includes a pair of copper terminal lugs for crimping to output wires to the load	
Input side fuse (5 mmX20mm, glass ferrule, delayed action)	For 120 VAC input: Rating 250 V, 8 A Manufacturer: Littell Fuse, Model No. 218008  For 230 VAC input: Rating - 250 V, 4A Manufacturer: Littell Fuse, Model 218004	
Weight	3.4 lbs	
Dimensions (L X W X H)	8" X 7.3" X 2.5" for SEC-1235 8.4" X 7.3" X 2.5" for SEC-1235M	

**Note:** The above specifications are subject to change without notice

### 3 YEAR Limited Warranty

SEC-1235/SEC-1235M manufactured by Samlex America, Inc. (the "Warrantor") are warranted to be free from defects in workmanship and materials under normal use and service. This warranty is in effect for 3 years from the date of purchase by the user (the "Purchaser")

For a warranty claim, the Purchaser should contact the place of purchase to obtain a Return Authorization Number.

The defective part or unit should be returned at the Purchaser's expense to the authorized location. A written statement describing the nature of the defect, the date of purchase, the place of purchase, and the Purchaser's name, address and telephone number should also be included.

If upon the Warrantor's examination, the defect proves to be the result of defective material or workmanship, the equipment will be repaired or replaced at the Warrantor's option without charge, and returned to the Purchaser at the Warrantor's expense.

No refund of the purchase price will be granted to the Purchaser, unless the Warrantor is unable to remedy the defect after having a reasonable number of opportunities to do so.

Warranty service shall be performed only by the Warrantor. Any attempt to remedy the defect by anyone other than the Warrantor shall render this warranty void.

There shall be no warranty for defects or damages caused by faulty installation or hook-up, abuse or misuse of the equipment including exposure to excessive heat, salt or fresh water spray, or water immersion.

No other express warranty is hereby given and there are no warranties which extend beyond those described herein. This warranty is expressly in lieu of any other expressed or implied warranties, including any implied warranty of merchantability, fitness for the ordinary purposes for which such goods are used, or fitness for a particular purpose, or any other obligations on the part of the Warrantor or its employees and representatives.

There shall be no responsibility or liability whatsoever on the part of the Warrantor or its employees and representatives for injury to any persons, or damage to person or persons, or damage to property, or loss of income or profit, or any other consequential or resulting damage which may be claimed to have been incurred through the use or sale of the equipment, including any possible failure of malfunction of the equipment, or part thereof.

The Warrantor assumes no liability for incidental or consequential damages of any kind.

Samlex America Inc. (the "Warrantor")  
110-17 Fawcett Road  
Coquitlam BC V3K6V2 Canada  
(604) 525-3836



**Attach copy of receipt here:**



SAMLEX AMERICA®

**Thank you purchasing a Samlex power supply product!**

**Samlex America Inc.  
110-17 Fawcett Road  
Coquitlam BC V3K 6V2  
Canada  
Tel: 1-800-561-5885 or 604-525-3836**