SME240-12-20
Owner's Manual

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READ THIS FIRST!
BEFORE INSTALLING THE SME240-12-20 CAREFULLY READ THE FOLLOWING INSTRUCTIONS, ESPECIALLY THE SAFETY NOTES AND WARRANTY CONDITIONS.

INTRODUCTION
The RFI SME240-12-20 (battery charger/eliminator) provides a power output of 280 watt at 13.6 Volts. The nominal input mains may be 220 V to 240 V and 50 Hz.

The SME240-12-20 has been designed specifically for telecommunications applications demanding high reliability, low noise, fully automatic battery backup, battery protection and full protection of the output. Many other applications will be able to take advantage of these features which include:

- Light compact design
- High Efficiency
- Battery over discharge protection with automatic reset
- High reliability with conservative thermal design allowing continuous full load operation with convection cooling
- Alarm for low mains and reverse battery connection
- User accessible output voltage adjustment
- Low noise output, ideal for telecommunications applications
- 3 modes of operation
- Convenient output connector
- Flexible mounting options
- Full protection for the power supply, load and battery
- Local technical support

Safety
Correct installation is the most critical factor in ensuring the safe use of the power supply. If every consideration in the Installation section of this manual has been satisfied the power supply will be safe to operate.

Operating Modes
The SME240-12-20 has three main operating modes:

1. As a battery eliminator it may be used to power equipment requiring 12 V –14 V at 20 A. It is fully protected against overload and short circuit as well as incorporating over voltage protection.

2. As a lead acid battery charger it will provide safe and convenient method to restore discharged batteries. Fully charged batteries can be left connected to the unit indefinitely with no adverse effects on their lifetime.

3. The full features of the unit are realised when both a battery and a load are connected so that it operates as a power supply with power fail protection. Under normal conditions an internal switch connects the battery in parallel with the load. The average load must be less than the capability of the power supply to ensure there is a remainder available to float charge the battery.

When a mains failure occurs, the power supply no longer provides power. The battery now supports the load without interruption of the load. Restoration of the mains restarts the power supply which will resume support of the load and charging of the battery.

During extended mains failures the unit disconnects the battery before it becomes excessively discharged. The battery is automatically reconnected when the mains recovers. This feature contributes to long battery lifetime and allows unattended operation of a system.

Protection
The power supply incorporates the following protection features

• Reverse polarity connection of the battery will not cause damage to the power supply or the battery and the output load will remain unaffected.
• Electronic battery fusing is provided in series with battery connection to protect the load and power supply when it is powered from the battery.
• Accurate current limit protection is provided for both load and battery. Automatic recovery from short circuit is provided with no current tailing in short circuit operation.
• Over voltage protection provides shutdown of power supply.
• Inrush Surge limiting at turn on.
• OTP over temperature protection for blocked fuse incorrect install.

Battery LVD Operation
A low voltage disconnect (LVD) is provided to prevent deep discharge of the battery.

LVD Operation
When mains has failed and the battery is supporting the load, the battery must be disconnected from the load if its voltage falls below the following levels:

Model	Battery Disconnect Condition (LVD_Disconnect)	Validation time ±30%
SME240-12-20	10.25 V ±0.25 V	1.8 sec

The battery will be connected to the charger/load output when its voltage rises above the following levels:

Model Battery	Connect Condition (LVD_Reconnect)	Validation time ± 30%
SME240-12-20	11.90 ± 0.30 V	2.3 sec

The battery disconnect is incorporated into the Battery +ve line.

The BATTERY output has protection incorporated against a reversed battery connection. A reversed battery is left disconnected so that the LOAD output can still run the load from mains power. The quiescent current drain on the battery when the main has failed is less than 3 mA.

Battery Charging Operational requirements

Battery Charge modes

To maintain the battery in a good state of health a charging algorithm is to be used to ensure that the correct voltages are applied to the battery terminals at the appropriate times throughout it's usage cycle.

The voltages for each Mode at 20°C is:

Float Voltage	Equalise Voltage
13.65 ± 2%	14.05 ± 2%

Trickle Charge

When mains is present but the battery voltage is below the LVD Connect voltage, the battery is trickle charged circuit that limits the charging current to a trickle charge current of 1.0A ± 20%.

Vfloat

During Vfloat mode the battery is charged at 10 A until the float voltage is reached.

Vequalise

Periodic equalise at 14.25 V is provided for 15 minutes every 24 Hours.

Battery Temperature Compensation

When the optional battery temperature sensor TMS101 is connected the output voltage will be adjusted by the amount shown in the table below to maintain the optimal battery changing voltage.

Temperature Compensation	Model Temperature Compensation (Reference Temperature = 20 °C)
SME240-12-20	-18 mV/C

Thermal Protection

A thermally controlled fan is used to maintain temperatures a non latching thermal shut down is used to protect against overheating due to:

- Use in excessive ambient temperature
- Output overload
- Fan failure/blockage
- Other fault conditions

Alarm Output

A pair of normally closed, floating relay contacts are provided to indicate alarm conditions. Alarm conditions are defined as any one or more of the following events:

- The mains fails.
- Over Voltage shut down has occurred.
- Thermal Shut down has occurred.
- The battery has been connected backwards.
- The battery circuit breaker has tripped.

The relay contacts are rated for 200 mA @ 60 Vdc

Led Indicator

Indicator colour	State
Green Solid	Mains OK Battery Fully Charged (If battery connected)
Green Flashing	Mains OK Battery Charging
Red Solid	Mains OK Fault detected (PSU has shut down) Battery is supplying the Load
Red Flashing	Mains OK Warning Temperature > 80-90% of trip level Load Current > 80-90% of maximum
Amber Flashing 2Hz rate, 25% duty cycle.	Mains Fail, Battery supplying the Load
Amber Flashing 2Hz rate, 5% duty cycle.	Mains Fail, Battery supplying the Load & Battery Voltage < 12.0V
Off	Mains Fail No battery connected or battery voltage < LVD disconnect voltage.

Table 1. Led indicator

Output voltage

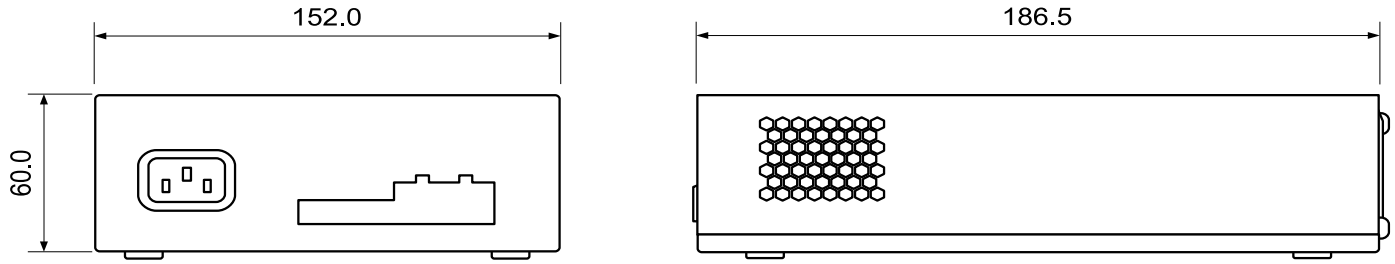
Output	Factory Setting (at no load)	Output Current (A)		Adjustable[1]	Power
		Minimum	Maximum		
Load	13.80 V ±0.15 V (No Battery present)	0	20	12-14 V	280 W
Battery	Set by battery Management	0	10 V	N/A	

Table 2. Output voltage

Note:The Battery Output is derived directly from the Load output. Its loading requirements subtract from the Load current.

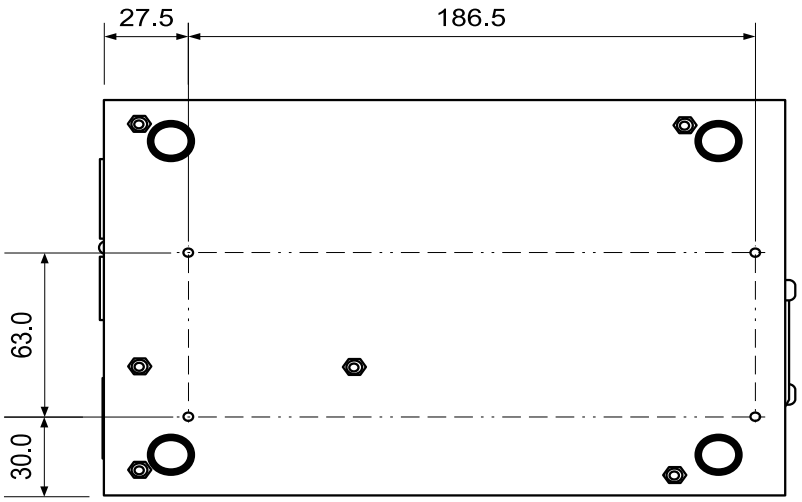
1. The output voltage is only adjustable when the PSU is turned on with no battery connected to the battery terminals. The adjustable range in the table is the minimum guaranteed range.

MECHANICAL
Dimensions and Mounting



Feet

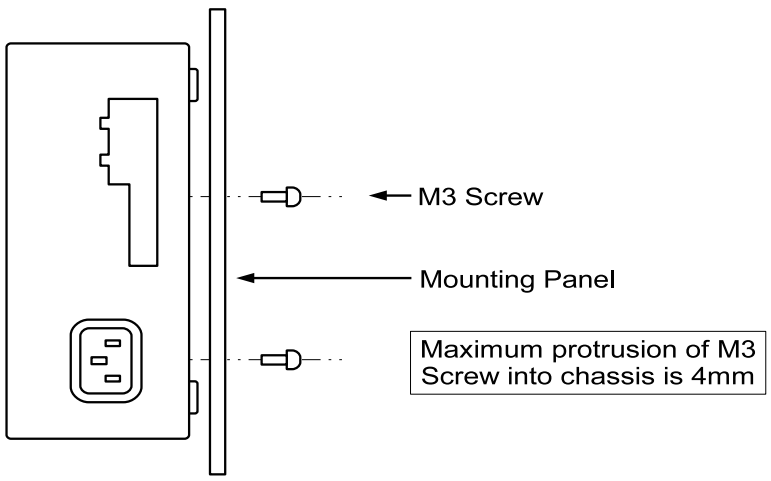
The SME240-12-20 has 4 x “feet” positioned in the corners of the bottom surface for bench mounting.



Mounting Points

The enclosure includes 4 x M3 threaded inserts on the bottom surface to allow the unit do be screwed to a mounting bracket.

(Centres are located at 186.5mm x 63mm spacing)



INSTALLATION

Installation should only be conducted and/or closely supervised by appropriately qualified person.

Mounting Options

The unit is supplied with 4 rubber feet for bench use. However, a number of mounting options have been provided to suit various installations. Mounting options have been provided underneath of unit in the form of M3 x 0.5 mm threads. The unit can be mounted horizontal or vertical to suit all types of installations.

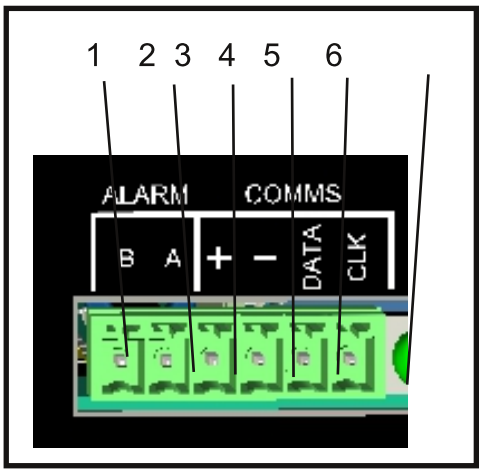
The maximum thread length for these screws is 4 mm from the outside edge of the power supply. Hazardous Voltages exist within the power supply so it is important that the screw lengths are adhered to.

Connectors

Input Mains: IEC320

Alarm Temperature sensor

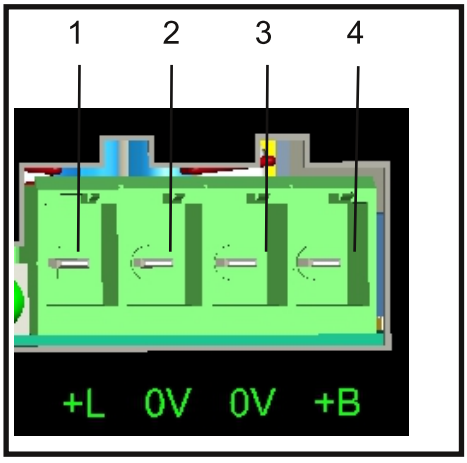
Function	Pin Number
Alarm A	1
Alarm B	2
SMBUS Supply (3V3)	3
SMBUS 0V	4
SMBDAT (SM.Bus data)	5
SMBCLK (SM.Bus clock)	6



Connector Style
6 Way Combicon type with screw terminal plug
Header: Phoenix MC1,5/6-G-3,81 (or MCV1,5/6-G-3,81) or compatible
Plug : Phoenix MC1,5/6-ST-3,81 or compatible

DC Power Output

Function	Pin Number
Load +ve	1
Load -ve	2
Battery -ve	3
Battery +ve	4



Connector Style
4 Way Combicon type with screw terminal plug
Header: Phoenix PC4/4-G-7.62 or compatible
Plug : Phoenix PCD4/4-ST-7.62 or compatible

Connection

The requirements for wiring a SME240-12-20 into a system are as follows:

LOAD (+L) & 0V

These 2 connections are the DC output of the power supply. These connections are to supply the load.

- These connections cannot be paralleled with output of duplicate power supply for increased current output.
- The load connection must not be directly connected to the battery or paralleled with the battery connection. This will disable the battery low voltage disconnect circuit and defeat the internal battery fuse.

Excessively long cable connections are not good practice. Try to keep these lines to a minimum to reduce system voltage drop.

BATTERY (+B) & 0V

These 2 connections are to be connected to the battery.

- Ensure that the battery is connected with the right polarity. Although reverse polarity will not harm the battery, power supply or the load, no backup of the load will occur during a power outage.
- Consult battery manufactures data before use with the power supply.
- Excessively long cable connections are not good practice. Try to keep these lines to a minimum to reduce system voltage drop.

RELAY

The 2 relay connections are the floating alarm relay contacts.

- Connect these pins to any circuit, which is required to be activated by an alarm condition. The 2 pins become shorted when an alarm condition occurs.
- These pins must not be connected to mains circuits or any other hazardous voltage circuits.

Cabling

AC Cabling: A cable size of 0.75 mm2 (18AWG) is recommended.

DC Cabling: A minimum cable size of 1.5 mm2 (16AWG) is recommended.

Note, maximum size of cable to output connector is 2.5 mm2 or 12AWG

DC load cables must be sized to carry the maximum full load current and not exceed the system volt-drop requirements.

Voltage Setting

When the PSU is turned on without the battery connected to the battery terminals, the output voltage may be adjusted within the range specified in table 2.

The output voltage adjustment is achieved in the following way:

- Remove any device from the SMBUS data pins and disconnect any battery.
- To increase the output voltage, short the SMBDATA pin (pin 5) to SMBUS0V (pin 4). The output voltage will increase by approximately 0.1 V/s
- To decrease the output voltage, short the SMBCLK pin (pin 6) to SMBUS0V (pin 4). The output voltage will decrease by approximately 0.1 V/s

If a battery is connected, the output voltage will revert to the battery voltage setting.

Cooling

The SME240-12-20 power supply has inbuilt thermal cooling to maximuse fan life.

Please ensure that there is no restriction to the venting of the unit.

SPECIFICATIONS

INPUT	Input Voltage	220 - 240 Vac, 50 Hz
		A 5 minute +15% surge will not damage the power supply
	Input Surge	< 40A For cold start when turned on at 240 V and excluding transient current
	Hold-up Time	> 20 mS, over the nominal input range
OUTPUT	Output Voltage	12.0 - 14.0V Adjustable
	Output Voltage Factory Set	13.80 V ±0.15 V
	Output Ripple Voltage	75 mV
	Output Power	280 W
	Load Regulation 1	±2% from set point taking into account all of line and load regulation and temperature coefficient when load powered by power supply
	Load Regulation 2	+0-2% of battery terminal voltage when load powered by battery
	Battery Disconnect	10.5 V ± 0.3 V
	Battery Reconnect	> 11.9 V ± 0.3 V
	Battery Hysteresis	1.5 V typ.
PROTECTION	Output Current	20 A
	Battery current	10 A (Factory setable)
	Over Voltage Protection	> 16.5 V
ENVIRONMENT	Efficiency	85% typ
	Operating Temperature	0 – 50 °C Ambient
	Altitude	0 – 2000 m
	Humidity	0 - 95% (non condensing)
	Cooling	Thermally controlled fan
OTHER	Battery Fuse	Electronic with automatic reset

Approvals

Approval	**Marking**		**Status**
ACMA	C-Tick		Yes
NSW Fair Trading	Approval Number	U20348EA	Yes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