



Fire detection and evacuation solutions that save lives.



# MultiAmp 5 Amp Power Supply

## Product Guide

MAN3086-2

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## 1 Item Numbers & Descriptions

4510-8205 – 5 Amp Power Supply Unit cw space for up to 2 x 38 Ahr batteries (enclosure size 2)

4510-8305 – 5 Amp Power Supply Unit cw space for up to 2 x 65 Ahr batteries (enclosure size 3)

4510-9005 – 5 Amp 27.6 VDC Power Supply Module

## 2 Features

The 4510-9005 is an EN54-4:1997 +A1 +A2 approved power supply ideal for use in Fire and Smoke and ventilation control Systems. Its regulated 27.6V dc output will supply up to 5 Amps continuous into the load, in addition to providing up to 850mA for charging the standby batteries up to 65 Ahr. The power supply output features electronic short circuit protection under both mains and standby battery operation. Maximum battery life is assured through continuous active battery monitoring and the use of a two stage charger, comprising bulk and temperature compensated final float phase depending upon battery condition.

Once fully charged the product operates in Eco power saving mode, whereby the batteries are typically charged for 4 hours in every 24-hour period while still continuously monitoring battery condition. This reduces wasted energy in continuously charging fully charged batteries and also extends their working life. Deep discharge protection prevents premature battery failure when operating from standby for extended periods.

Two sets of volt free solid state relay fault output signal (i) loss of mains and (ii) battery fault, charger fault and loss of output.

- Certified by UL to EN54-4:1997 +A1 +A2.
- Up to 5A current to load at 27.6V dc nominal regulated output.
- Charging capability to support 17/18, 38/40 or 65 Ahr batteries.
- Electronic overload protection shuts down output until overload or short circuit is removed.
- Battery Monitor detects battery missing, low battery, short-circuit or reverse connection or circuit impedance ( $R_i$ ) in excess of  $500m\Omega$  caused by connector or wiring corrosion within 4 hours.
- Battery charging circuit is energised only when a battery is correctly connected and the battery voltage is greater than 14 V.
- No loss of output during automatic connection of battery to load on loss of mains.
- Deep discharge protection disconnects battery from load when battery voltage falls below 21 V.
- Diagnostic indicator LED (Orange) (Internal).
- Fault indicator LED (Yellow) flashes on detection of output fault, battery fault, charger fault and mains failure.
- Mains indicator LED (Green) showing mains present Indicators check at start-up.

### 3 Specification

#### 3.1 Mains Input

Rated Voltage (Operational voltage)	110 – 240V ac (90 – 264V ac)
Frequency	50 Hz
Input current	< 2.0 Amps at full load
Inrush current	25A Max at 25 °C 110V ac for 10 ms
Fuse	T3.15 A 20mm, 250V ac HRC

#### 3.2 Low Voltage D.C. Output

- Voltage at full load Mains power Battery standby	27.0 – 28.3V dc (range) (27.6 V nominal) 20.3 – 26.0V dc		
Ripple	<100 mV pk – pk max @ Rated Voltage		
Fuse Load Battery	F5.0 A F5.0 A		
Battery mode selected	18 Ahr	40 Ahr	65 Ahr
Continuous Output Current No charging (Imax B) With charging (Imax A)	5.0 A 5.0 A	5.0 A 5.0 A	5.0 A 5.0 A
Battery Capacity eg Ampac Item No	2 x 18 Ah 12 V 210-0003	2 x 40 Ah 12 V 210-0013	2 x 65 Ah 12 V 210-0015
Battery Charging	Constant current bulk charging to 80% capacity within 24 hours Float charging to 100% within 48 hours Eco charging and check every 24 hours – (for up to 8 hours pulse charge dependent on temperature)		
Constant current charge	0.85 A		
Low battery threshold voltage	23 V		
Deep discharge protection	Threshold voltage – 21 V		
Quiescent current – no load	< 30 mA @ 27.6 V		
Quiescent current – batt cut off	0 mA @ 27.6 V		

#### 3.3 Mechanical

Product Reference	4510-8205	4510-8305
Enclosure Dimensions W x H x D	420mm x 400mm x 216mm	420mm x 680mm x 216mm
Weight (kg) excluding battery	8.2kg	13kg
Material	1.2 mm steel Surf Mist ripple powder coated	

### 3.4 Environmental

Temperature – Operating	-10 to +40°C (operating) 75% RH non-condensing
Temperature - Storage	-20 to +80°C (storage)

### 3.5 Connections and Signalling outputs

Load Output +/-	Screw terminals Voltage output to load
GEN PSU Fault (normally closed contact)	0.10 A @ 60 Vdc 16Ω solid state relay contacts, volt free Open if Mains failed and battery voltage < 23 V or fault PSU fault condition, (see below)
EPS Fault (normally closed contact)	0.10A @ 60 Vdc 16Ω solid state relay contacts, volt free Open if loss of mains for > 10 seconds
Temperature sensor	Thermistor input from supplied battery terminal thermistor.
BATT + / -	Connection to back up battery using supplied battery lead.

## 4 Signalling and Diagnostics

### 4.1 Fault Outputs

EPS Fault	GEN Fault	Condition	Possible Cause	Action
Closed	Closed	Normal operation	Mains present Battery healthy	None
Open	Closed	Standby Mode	Mains lost Battery driving load	Investigate loss of mains
Closed	Open	Fault Present	Blown fuses Battery fault Internal fault	Investigate fault source using diagnostic LED Rectify fault where possible
Open	Open	PSU Shutdown	Mains lost Standby battery exhausted	Restore mains as soon as possible

### 4.2 LED Indication

YELLOW LED	Fault LED
GREEN LED	Mains supply On
DIAGNOSTICS	Diagnostic LED (Not visible through front panel)

#### 4.3 Fault Diagnostic table – Front panel – User

Yellow LED Fault	Green LED Mains	Condition	Possible Cause	Action
Off	On	Normal operation	Mains present Battery healthy	None
Flash Continuous	On or Off	Fault	Blown fuses Battery fault Internal fault	Contact service engineer
1 Pulse	Off	Standby Mode	Mains lost Battery driving load	Investigate loss of mains

#### 4.4 Fault Diagnostic table – Internal - Engineer

Orange LED Diagnostic	Green LED Mains	Condition	Possible Cause	Action
Off	On	Normal operation	Mains present Battery fully charged	None
	Off	Standby Operation	Mains Lost. No faults present Battery driving load	Investigate loss of mains
Flash Continuous	On or Off	No output	Output fuse blown Output overload Output short circuit	Check and replace output fuse Disconnect output load and test load
1 Pulse	On	Battery Charging	No faults active Battery charging normally but < 90% of full charge	None
2 Pulses	On	No Battery	Battery disconnected Battery fuse blown Battery heavily discharged	Check battery connections Check battery fuse Check battery condition Replace battery if aged
	Off	Low Battery Volts	Standby Mode Battery almost discharged	Restore mains
3 Pulses	On or Off	Battery Fault	High impedance in battery connection Battery internal fault	Check battery connections for corrosion. Replace battery if aged
4 Pulses	On or Off	Charger Fault	Internal failure of battery charger	Return to manufacturer
5 Pulses	On or Off	Battery Temperature Probe Fault	Battery temperature monitor disconnected or damaged PSU running in Safe Mode	Check temperature sensor connections and condition of sensor. Replace if suspect

## 5 Installation

This unit is only suitable for installation as permanently connected equipment. The PSU is NOT SUITABLE for external installation. This product (PSE) is designed for the use in automatic fire detection and fire alarm systems. If it is used as power supply equipment for control and indicating equipment, the PSE shall be installed no further than 10cm from the CIE, and close coupled by conduit.

This unit must be fed from a mains power source having a separate (approved) disconnect device and fitted with a fuse or other over-current protection device rated at 5 A maximum. Ensure that the disconnect device used has appropriate earth fault protection to the applicable standard.

Where the PSU is used to provide power to a fire alarm circuit, the mains isolation and disconnect device should be provided solely for this purpose and be suitably marked "FIRE ALARM – DO NOT TURN OFF". All cabling should meet national and local fire system installation regulations, e.g. FP200 type cable for high integrity installations.

Where the PSU is used for other applications, it should be installed according to all relevant safety regulations applicable to that application.

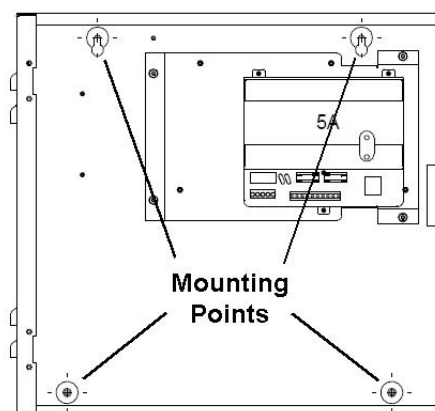
Where the GEN PSU Fault and EPS Fault outputs are used, they should only be connected to circuits having voltages less than 60 Vdc.

### 5.1 Cable Sizing

- 1) Mains input cable must be to the applicable standard with a 5 A or greater current capacity, i.e. 0.75 mm<sup>2</sup> nominal conductor area, having a minimum operating voltage of 300/500 Vac.
- 2) The low voltage output cable must be sized to carry the rated load current to the devices connected to the PSU.
- 3) Mains input and low voltage output cables should be routed to use different entry / exit holes in the case. Bushes should be used to protect cable sheaths from chafing. Ensure that these bushes are correctly sized (i.e. close fitting with respect to cable sizing). Note that the bushes should meet a minimum flammability specification of UL94 HB.
- 4) All cabling should be securely fastened in position using a cable tie through the saddles provided.

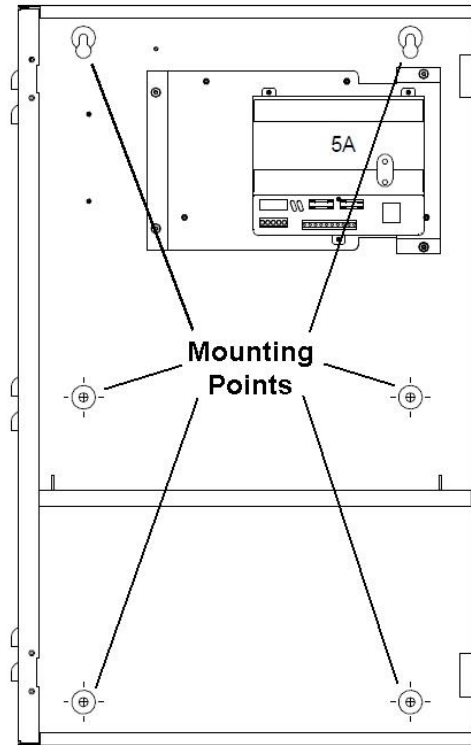
### 5.2 Mounting Enclosure Size 2 – Item No 4510-8205

The enclosure is designed to support two 18 Ahr or 40 Ahr batteries, and as such has a maximum weight of 34kg when loaded. Ensure that wall fixings are appropriate to support this weight.



### 5.3 Mounting Enclosure Size 3 – Item No 4510-8305

The enclosure is designed to support two 65 Ahr batteries, and as such has a maximum weight of 55Kg when loaded. Ensure that wall fixings are appropriate to support this weight.

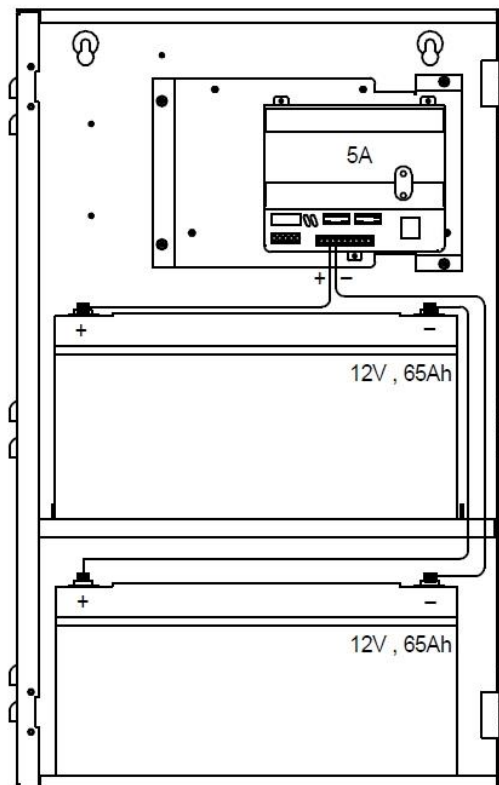
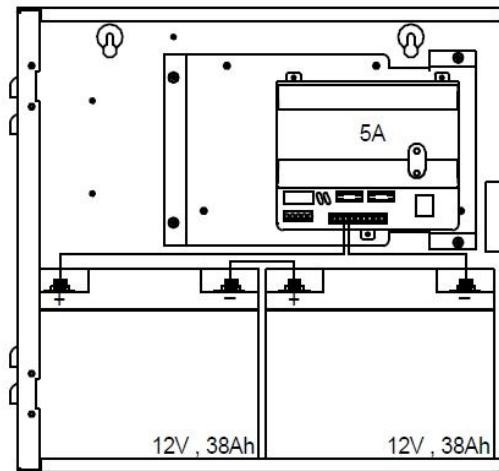


### 5.4 Enclosure Mounting Points

- 1) The product should be mounted no further than 10 cm from the control and indicating equipment, close coupled by conduit if it is being used to power the CIE directly.
- 2) Fix to wall or other structure in correct orientation i.e. with hinge on left hand side, using screws of sufficient size and length through the mounting holes.
- 3) Protect the battery terminals from any metal surfaces during installation as shorting of the terminals is hazardous.
- 4) Knock-outs are provided in the case for mating with external trunking or conduit.
- 5) Ensure that all unused holes (on the rear of the case) are sealed to prevent the ingress of damp and dust.



## 5.5 Battery Placement within Enclosure



**WARNING** – Always fit 2 batteries and wire in series, the product will not work correctly with a single 12V battery.

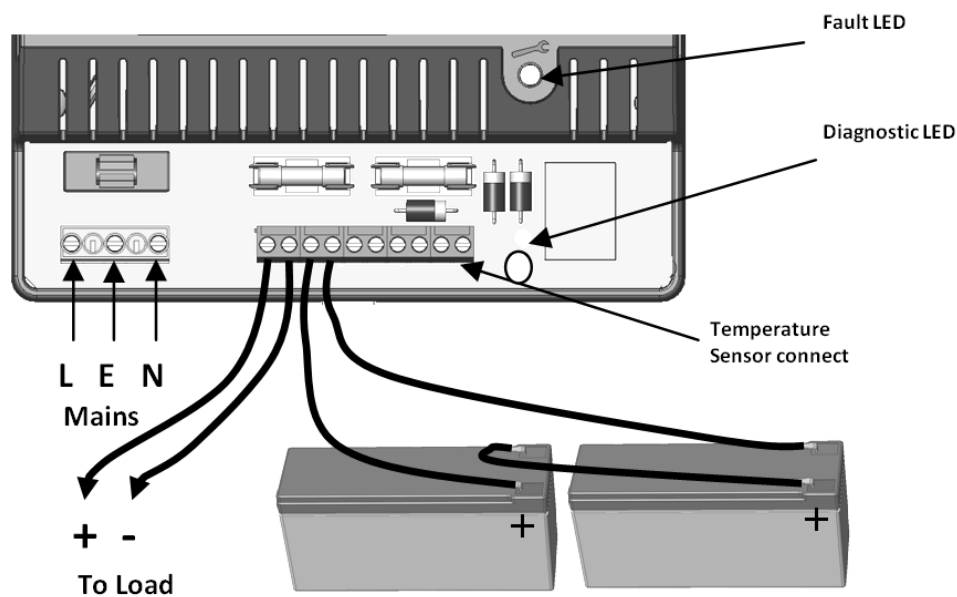
## 6 Commissioning

### 6.1 Mains Power Up

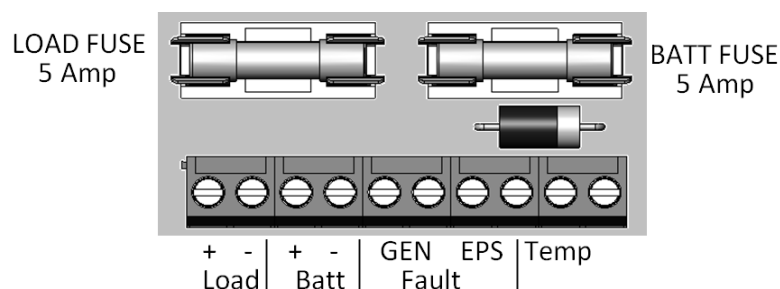
- 1) With no external connections made to the PSU, connect the mains input wires to the terminal block, **ensuring that the mains isolator (disconnect device) is open**. Fasten wiring in place with cable tie to saddle. **Note: Equipment must be earthed.**
- 2) Apply mains input. Confirm that all LED indicators flash on briefly proving integrity of indicating circuits. Ensure that the green Mains LED then stays illuminated and that the yellow Fault LED flashes after approximately 3 s (indicating a disconnected battery).
- 3) Disconnect the mains power.

### 6.2 Load Output and Remote Signalling

- 4) Connect the EPS and GEN PSU Fault outputs to the appropriate inputs of control equipment if remote fault monitoring is required.
- 5) Connect the load (output) wiring as shown below. Cable tie to saddle provided (adjacent to exit hole).



- 6) Re-apply mains. Verify that the green Mains LED illuminates and the yellow Fault LED flashes after approximately 3 s (disconnected battery).
- 7) If connected, verify that the EPS Fault monitor shows a *closed* contact and the GEN PSU Fault monitor shows an *open* contact.
- 8) Perform a full functional test of system including full alarm condition.
- 9) Disconnect the mains.



### 6.3 Standby Battery

- 10) Mount the appropriate batteries as shown above.
- 11) With mains *disconnected*, connect the two 12 V standby batteries in series using the single cable provided. Connect the *negative* of one battery to the *positive* of the other. **DO NOT CONNECT** the other two battery terminals to each other.
- 12) Connect the free Positive and Negative terminals of the batteries to the PCB terminals Batt+ and Batt - using the cables provided. Connect the battery temperature sensor (two white wires) to the PCB terminals marked TMP Sens.
- 13) Re-apply mains and, after the LED indicators initial start-up flash, verify that the yellow Fault LED does not flash (battery connection detected). Verify that the remote GEN PSU Fault monitor shows a *closed* contact.
- 14) Disconnect the mains power. Verify that the green Mains LED extinguishes and the yellows Fault LED starts to pulse (indicating that the PSU is running from its standby batteries).
- 15) If connected, verify that the EPS Fault monitor shows an *open* contact and the PSU Fault monitor shows a *closed* contact.
- 16) Perform a full functional test of system including full alarm condition. Verify that the standby batteries can support the system load. Note: ensure batteries have sufficient charge.

#### Final

- 17) Reconnect the mains. Verify that the green Mains LED illuminates and the yellow Fault LED extinguishes.
- 18) If connected, verify that the EPS Fault monitor shows a *closed* contact and the GEN PSU Fault monitor shows a *closed* contact.
- 19) Close cover and secure using fastening screws provided.

**NOTE: Batteries must be connected before mains power is applied to enable the batteries to be utilised. When replacing batteries, re-connect new batteries and then cycle the mains power.**

## 7 Operating Instructions

In the event of loss of mains, a battery fault or a GEN PSU fault, the corresponding Fault signal contacts will open.

If the output of the PSU fails, the cause of the failure should be investigated e.g. short circuit load, connection of a deeply discharged battery. The fault should be rectified before restoring power to the PSU. If any of the fuses require replacing, ensure the correct fuse rating and type is used.

## 8 Maintenance

This unit is intended for use by Service Personnel only. There are NO USER SERVICEABLE parts inside.

There is no regular maintenance required of the PSU other than periodic testing, and replacement of the standby battery. **Reference should be made to the battery manufacturer's documentation to determine typical/expected battery life with a view to periodic replacement of the battery.**

## 9 Disposal of Product at End of Life

This product falls within the scope of EU Directives 2002/96/EC Waste Electrical and Electronic Equipment (WEEE) and 2006/66/EC (Battery). At the end of life, the product must be separated from the domestic waste stream and disposed via an appropriate approved WEEE disposal route in accordance with all national and local regulations.

Before disposal of the product, any batteries must be removed, and disposed separately via an appropriate approved battery disposal route in accordance with all national and local regulations. Package used batteries safely for onward transport to your supplier, collection point or disposal facility.

***Caution: Risk of fire or explosion***

***if bare battery wires are allowed to touch.***

See Specification for battery type information. The battery is marked with the crossed out wheellie bin symbol, which may include lettering to indicate cadmium (Cd), lead (Pb), or mercury (Hg).

For more information, see: [www.recyclethis.info](http://www.recyclethis.info)

**UNCONTROLLED DOCUMENT**

NOTE: Due to AMPAC's commitment to continuous improvement specifications may change without notice.