



Fire detection and evacuation solutions that save lives.



10 Amp 27.6Vdc Power Supply Unit

MAN3207

10 Amp 27.6Vdc Power Supply Unit

Item Numbers: 4510-9210 & 4510-9310

Instructions Manual**Features**

This Power Supply Unit is an AS 7240.4:2018 approved power supply ideal for use in Fire control Systems. Its regulated 27.6V dc output will supply a total of 10 Amps continuous into the load, whilst also enabling battery charging. (7.2 Amps Load with 65Ah batteries, 10 Amps with 18Ah batteries).

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 three-stage charger, comprising bulk, absorb 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 charged for 4 hours in every 24 hour period while still being continuously monitored. This reduces wasted energy in charging already fully charged batteries and 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 SAI Global to AS 7240.4:2018 (SMK41654)
- Up to 10A current to load at 27.6V dc nominal regulated output.
- Charging capability to support 18, 40 or 65Ah batteries with intelligent load enhancement.
- 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 (Ri) in excess of 300mΩ caused by connector or wiring corrosion within 4hours.
- 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 to 21 V.
- Fault indicator LED (Yellow) flashes on detection of output fault, battery fault, charger fault and mains failure.
- Mains indicator LED (Green) showing mains supply present.
- 6 x 1A fused low voltage outputs are provided

Specifications

Mains Input	
Rated Voltage	110 – 240V ac
Frequency	50 Hz
Input current	< 4.0 Amps at full load
Inrush current	30 A Max at 25 °C 110V ac for 10 ms
Fuse	T4.0 A, 20 mm, 250V ac HRC
Output	
Voltage at full load	
Mains power	26.0 – 28.5 Vdc (range) (27.6 V nominal)
Battery standby	18 – 26.0 Vdc
Ripple	<100 mV pk – pk max @ Rated Voltage
Fuse	
Load	F10.0 A
Battery	F10.0 A
Overload	Electronic shutdown at 15 A until overload or short circuit removed

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Battery mode selected	17/18 Ah	38/40 Ah	65 Ah
Continuous Output Current (Imax A = Imax B) – 220V (Imax A = Imax B) – 110V	10.0 A 8.5 A	8.0 A 7.5 A	7.2 A 6.5 A
Battery Capacity e.g. - PowerSonic model - Yuasa model - Interlogix model - Ampac Batteries	2 x 17/18Ah 12 V PS12170 NP17-12 BS131N 210-0003 (18Ah)	2 x 38 Ah 12 V PS12380 NP38-12 210-0013 (40Ah)	2 x 65 Ah 12 V PS12650 NP65-12 BS133N 210-0015 (65Ah)
Battery Charging	Constant current bulk charging to 80% capacity within 24 hours Float charging to 100% within 48 hours Eco charging and check every 2 hours – (for 20 minutes)		
Constant current charge	0.7 A	1.6 A	2.6 A
Low battery threshold voltage	23 V		
Deep discharge protection	Threshold voltage – 21 V		
Quiescent current – no load	30 mA		
Quiescent current – batt cut off	0 mA		

Mechanical

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Enclosure Dimensions w x h x d (mm)	420 x 420 x 180	400 x 680 x 180 (Increased enclosure size to accommodate 2 x 65Ahr batteries)
Weight (kg) excluding battery	9.7 Kg	14 Kg
Material	1.2 mm steel white powder coated	

Environmental

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

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.
FAN + / -	Not used

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Signaling and Diagnostics

Fault Outputs

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

LED Indication

LED type	Function
Yellow LED	Fault LED
Green LED	Mains supply On
Orange LED	Diagnostic LED (Not visible through front panel)

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 Overload Internal fault	Contact service engineer
1 PULSE	OFF	Standby Mode	Mains lost Battery driving load	Investigate loss of mains

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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
ON CONTINUOUS	ON or OFF	Internal Fault	Software fault detected PSU running in Safe Mode	Return to manufacturer

10 Amp 27.6Vdc Power Supply Unit**Item Numbers: 4510-9210 & 4510-9310****Instructions Manual****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. NOTE: Cable runs to the load(s) must not exceed 30m.

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

Cable Sizing

1. Mains input cable must be to the applicable standard with a 5 A or greater current capacity, i.e. 0.75 mm² 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. NOTE: Cable runs to the load(s) must not exceed 30m.
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.

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Mounting – 4510-9210

- 1) The 4510-9210 box is designed to handle and support two 38 or 40 Ah batteries and as such weighs a total of approximately 40 Kg when loaded. Ensure that wall fixings are appropriate and designed to support this weight.
- 2) 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.
- 3) 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.
- 4) Protect the battery terminals from any metal surfaces during installation as shorting of the terminals is extremely hazardous.
- 5) Knock-outs are provided in the case for mating with external trunking or conduit.
- 6) Ensure that all unused holes (on the rear of the case) are sealed to prevent the ingress of damp and dust.

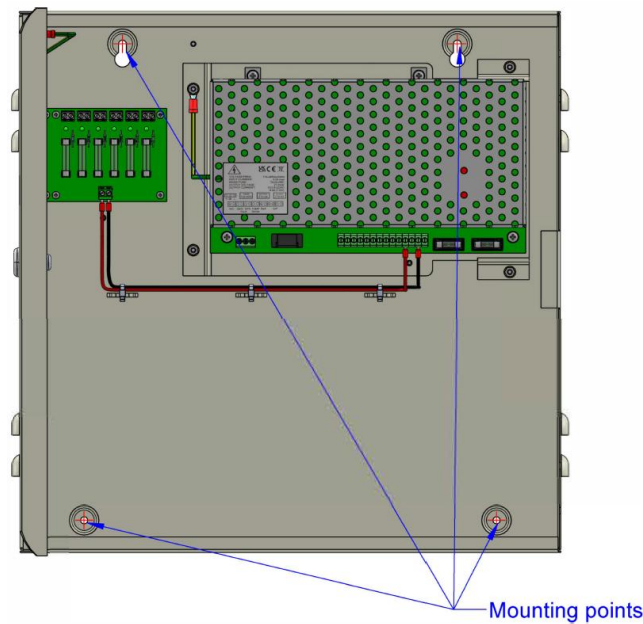


Figure 1 - Box mounting

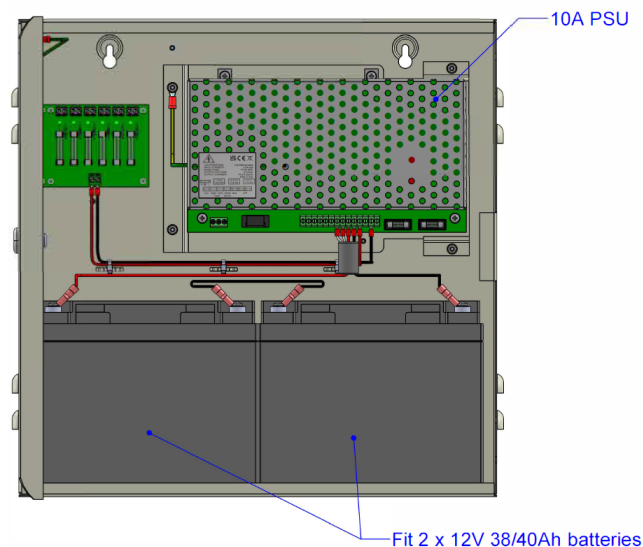


Figure 2 - Battery fitting and assembly

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- 1) The 4510-9310 box is designed to handle and support two 65 Ah batteries and as such weighs a total of approximately 60 Kg when loaded. Ensure that wall fixings are appropriate and designed to support this weight.
- 2) 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.
- 3) 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.
- 4) Protect the battery terminals from any metal surfaces during installation as shorting of the terminals is extremely hazardous.
- 5) Knock-outs are provided in the case for mating with external trunking or conduit.

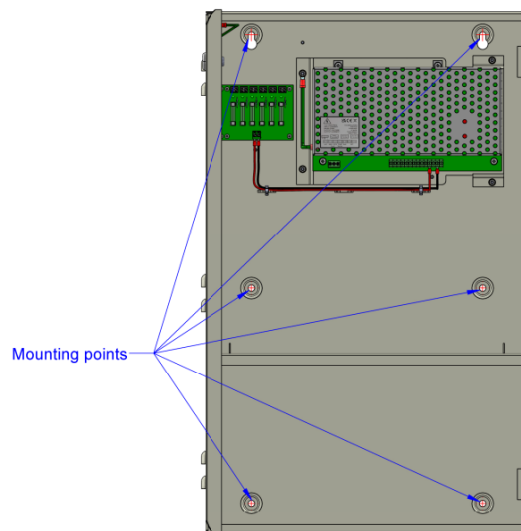


Figure 3 - Box and Battery box mounting

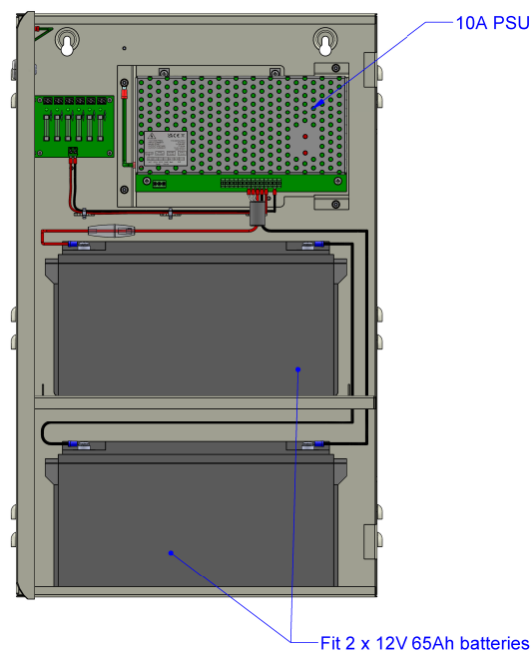


Figure 4 - Battery fitting and assembly

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Commissioning

Mains Power Up

- 1) With no external connections made to the PSE, 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. Ensure that the green Mains LED illuminates and that the yellow Fault LED flashes after approximately 20s (indicating a disconnected battery).
- 3) Disconnect the mains power.

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.

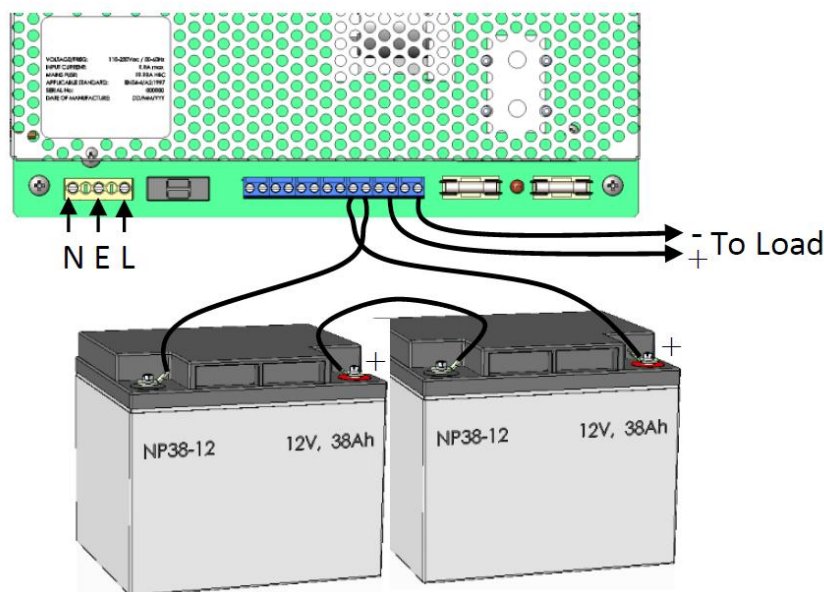


Figure 5 - Power, Load and Battery connections

- 5) Connect the load (output) wiring as shown in Figure 4. Cable tie to saddle provided (adjacent to exit hole). **NOTE:** Cable runs to the load(s) must not exceed 30m.
- 6) Re-apply mains. Verify that the green Mains LED illuminates and the yellow Fault LED flashes after approximately 20 s (disconnected battery).
- 7) If connected, verify that the EPS Fault monitor shows a closed contact and the PSU Fault monitor shows an open contact.
- 8) Perform a full functional test of system including full alarm condition.
- 9) Disconnect the mains supply.

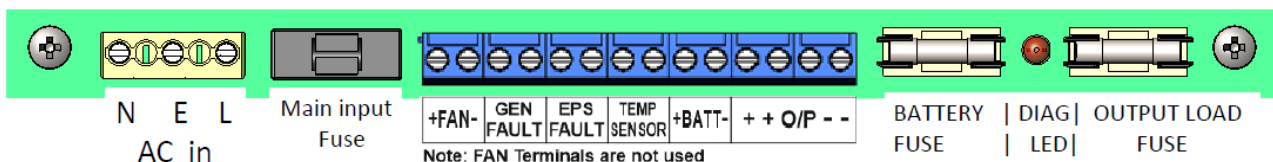


Figure 6 - Terminal labels

Standby Battery

- 10) Select the Battery type by placing the link (above the Battery fuse) in the appropriate location to select (17/18 Ah, 38 Ah or 65 Ah) batteries. This changes the maximum bulk charge current, and therefore enables higher

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load current to be used when smaller batteries are required. Put the link on the left hand two pins for 17/18 Ah, the middle pins for 38 Ah and the right hand two pins for 65 Ah batteries.

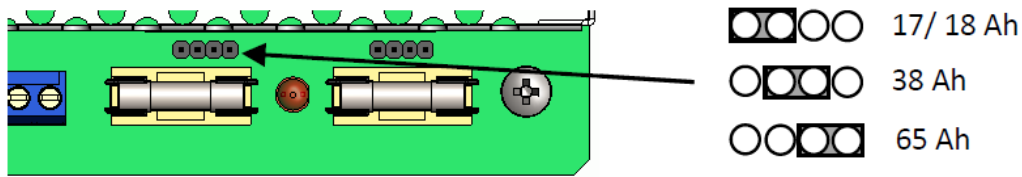


Figure 7 - Standby battery size selection links

- 11) Mount the appropriate batteries as shown above. Where a dual box solution is used all cabling between the two boxes should be routed to use separate case entry/exit holes from other cabling and use suitable bushes to protect the cables.
- 12) 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.
- 13) Connect the free Positive and Negative terminals of the batteries to the PCB terminals Batt+ and Batt - using the cables provided. See Figures 4 & 5.
- 14) Connect the battery temperature sensor (two white wires) to the PCB terminals TEMP SENSOR. See Figure 5.
- 15) If the batteries are housed remotely, replace the battery lead assembly (including battery temperature sensor) with an extended length assembly, provided with the Battery box (Ensure the temperature sensor and battery connections are made according to figure 5).
- 16) Re-apply the mains power and verify that the yellow Fault LED stops flashing after about 20 s (battery connection detected). Verify that the remote GEN PSU Fault monitor shows a closed contact.
- 17) Disconnect the mains power. Verify that the green Mains LED extinguishes and the yellow Fault LED starts to pulse (indicating that the PSU is running from its standby batteries).
- 18) If connected, verify that the EPS Fault monitor shows an open contact and the PSU Fault monitor shows a closed contact.
- 19) 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

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

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 PSE 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 PSE. If any of the fuses require replacing, ensure the correct fuse rating and type is used.

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 PSE 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.**

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Green LED On = Mains Present

Yellow LED Fault Diagnostics according to table:

Yellow LED (fault)	Green LED (mains)	Status
OFF	ON	Normal: Battery fully charged
One short flash every second	ON	Normal: Battery charging but not fully charged
Flashing: 1 second On 1 second Off	ON	Fault: Output fuse or battery fuse blown, or battery missing
	OFF	Fault: No mains, output fuse blown
One short flash every 3 seconds	OFF	Fault: No mains, battery supplying load.
OFF	OFF	Fault: No mains, No output, Batteries disconnected or completely discharged

Compliance

This power supply meets the essential requirements and other related provisions of the new LV 2014/35/EU and EMC 2014/30/EU directive as well as the latest ROHS2 2011/65/EU, WEEE 2012/19/EU and Battery 2013/56/EU directives.

Disposal of product at End of Life

This product falls within the scope of EU Directives 2012/19/EU 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 wheelee bin symbol, which may include lettering to indicate cadmium (Cd), lead (Pb), or mercury (Hg).

The packaging supplied with this product may be recycled. Please dispose of packaging accordingly.

UNCONTROLLED DOCUMENT

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