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STANDBY 220V AC POWER SYSTEM
IDEAL FOR CCTV CAMERA SYSTEMS

Models:
4HR-UPS-8CAM™ 4HR-UPS-16CAM™
4HR-UPS-32CAM™

FEATURES

The Elmdene's 4HR-UPS™ range is available in 3 models, each designed to provide 220V ac with standby battery capability for CCTV systems consisting of up to 32 cameras. Designed with the security industry in mind, the range provides extended backup times of typically 4 hours to a complete PoE CCTV system, whilst utilising readily available, cost effective, industry standard 12V SLA batteries.

In the event of a mains failure, the 12V batteries seamlessly continue to provide standby power to the system until the mains power is restored or the batteries reach their deep discharge protection limit. Mains fail volt-free contacts are also available to signal a mains failure, if required.

The range is offered in 3 models, based on the typical size of the CCTV system:

- 4HR-UPS-8CAM Ideal for up to 8 cameras (100W(VA) max*)
- 4HR-UPS-16CAM Ideal for 9 to 16 cameras (200W(VA) max*)
- 4HR-UPS-32CAM Ideal for 17 to 32 cameras (220W(VA) max*)

All models consist of a 19" rack (4U height) head unit, and an additional floor standing battery cabinet provided for the 16 & 32 camera variants. Mains powered, they provide a 220V ac output to power the connected device(s) such as a PoE NVR or a Power over Coax CCTV system & monitor.

The 4HR-UPS™ 220V ac output is provided via a Pure Sine Wave inverter, allowing it to be backed up by 2x 12V standby batteries.

- Continuous full rated power to load
- Battery Deep Discharge Protection
- Mains input voltage 200 – 240V ac
- Volt-free contact signalling mains failure
- Volt-free contact signalling lid tamper and PSU faults
- 4U 19" rack enclosure
- Rear battery access (2 x 12V 18Ah batteries)
- Reverse battery protection
- Blue LED indicates Inverter health
- Red LED indicates running in standby (battery) mode
- Provides extended standby times
- Supplied with 2m IEC input power cord (UK plug)
- C13 IEC socket outlet
- Floor standing battery cabinet (16 & 32 Camera variants)

*Maximum load stated is based on a unity power factor (1). To determine power factor contact the equipment manufacturer OR test system load to determine the actual VA using a power meter, alternatively you must de-rate the UPS Max load by 50%

SPECIFICATION

Input Specification

Voltage (rated)	220-240V ac 50–60Hz
Max Current	8CAM - 4A (T4A HRC fused) /16/32CAM - 5A (T5A HRC Fused)

220V ac Output Specification

Voltage	220V ac +/-5%
Frequency	50–60Hz
Wave form	Pure Sine Wave
Max load Power	4HR-UPS-8CAM - 100W(VA) * 4HR-UPS-16CAM - 200W(VA) * 4HR-UPS-32CAM - 220W(VA) *

*Maximum load stated is based on a unity power factor (1). To determine power factor contact the equipment manufacturer OR test system load to determine the actual VA using a power meter, alternatively you must de-rate the UPS Max load by 50%

Standby Battery

Battery Type	2 x 12V Valve Regulated Sealed Lead Acid
Battery Capacity	See table below
Battery Cut-off (Deep discharge protection)	21V

Standby time examples (utilising 2 x batteries):

Model reference	Continuous Load	Batteries	Approximate Standby time** (hours)	Recharge Time (hours)
4HR-UPS-8CAM *(100W max*)*	40W	2 x 12V 18Ah	7.5	<24
	70W		4	
	100W		2.5	
4HR-UPS-16CAM *(200W max*)*	145W	2 x 12V 38Ah	4	<48
	175W		3	
	200W		2.5	
4HR-UPS-32CAM *(220W max*)*	110W	2 x 12V 65Ah	10	<100
	175W		6	
	220W		4	

*Maximum load stated is based on a unity power factor (1). To determine power factor contact the equipment manufacturer OR test system load to determine the actual VA using a power meter, alternatively you must de-rate the UPS Max load by 50%

**Standby times are approximate and can vary dependant on battery age and condition and are calculated based on Yuasa's technical data.

Extended Standby time examples (utilising 4 x batteries***):

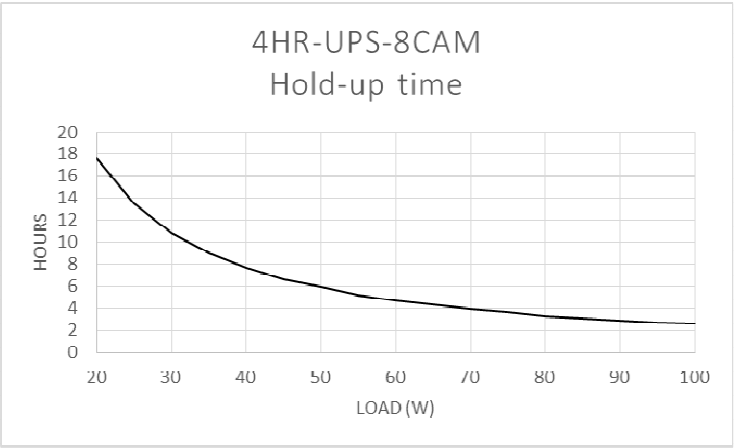
Model reference	Continuous Load	Batteries (12V SLA)	Approximate standby time** (hours)	Recharge Time (hours)
4HR-UPS-16CAM	175W	2 x 12V 18Ah +	4	<72
(200W max)*	200W	2 x 12V 38Ah	**3**	
4HR-UPS-32CAM *(220W max*)*	220W	2 x 12V 18Ah + 2 x 12V 65Ah	5	<100

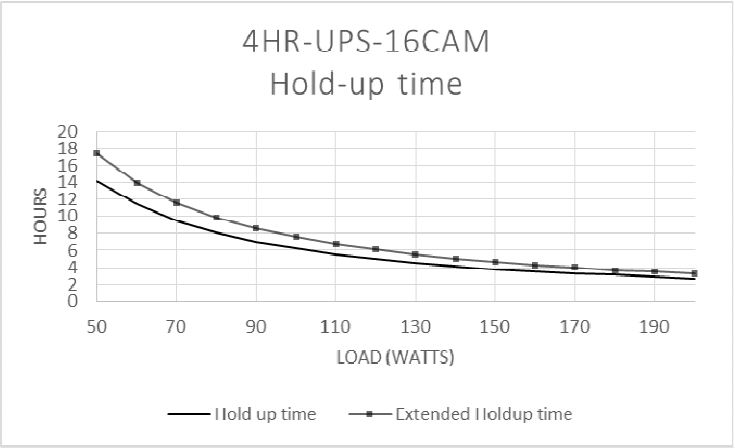
*Maximum load stated is based on a unity power factor (1). To determine power factor contact the equipment manufacturer OR test system load to determine the actual VA using a power meter, alternatively you must de-rate the UPS Max load by 50%

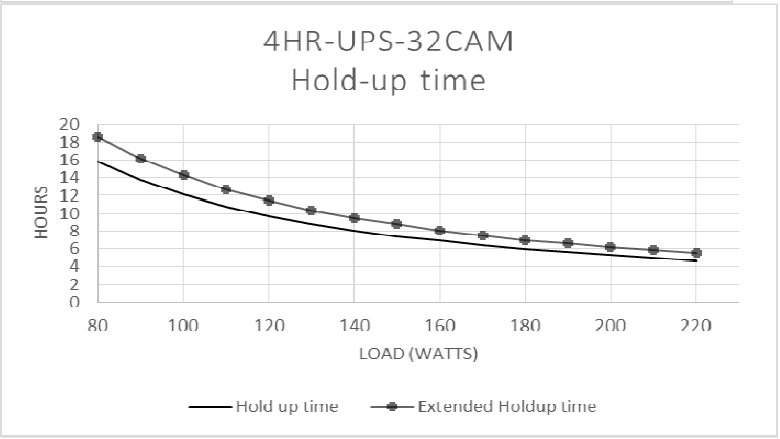
**Standby times are approximate and can vary dependant on battery age and condition and are calculated based on Yuasa's technical data.

***Ensure the specially designed battery link cable is used in accordance with connection diagram when connecting 4 batteries together. It is important that all the batteries are of a similar age, condition and preferably from the same manufacturer to preserve their life expectancy. When changing batteries ensure they are changed as a pair.

Standby Time rating Curves







Example CCTV system power requirements:

System Components	Approximate Load*
4 Camera + NVR/HDD	44W
8 Camera + NVR/HDD	68W
16 Camera + NVR/HDD	116W
32 Camera + NVR/HDD	212W

*Check equipment manufacturer details for actual power requirements. Figures above based on 6W PoE cameras and 20W NVR with HDD installed. We recommend where specific standby times are required that you over specify the UPS battery choice to take into account natural battery degradation.

Maximum load stated is based on a unity power factor (1). To determine power factor contact the equipment manufacturer OR test system load to determine the actual VA using a power meter, alternatively you must de-rate the UPS Max load by 50%

Mechanical

Model	Enclosure Dimensions (mm)	Weight (kg) [Excluding batteries]
4HR-UPS-x™ (4U 19" Rack)	400L x 483W x 172H	14 KG*
Floor standing battery cabinet (Supplied with 16 and 32 camera models)	450W x 535H x 245D	13 KG

*Due to the weight of the 4U 19" UPS enclosure and 2 x 12V 18Ah batteries ensure suitable rack fixings and rails are used when securing in 19" rack

Environmental

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

FAULT SIGNALLING OUTPUTS

General Fault 0.1 A @ 60V dc N/O volt-free contact.
Open if Mains failed and battery voltage < 23 V, lid tamper activated or fault PSU fault condition, (see below)

Mains Fault 0.1A @ 60V dc N/O volt-free contact.
Open when loss of mains for more than 8s.

SIGNALLING AND DIAGNOSTICS

MAINS Fault	GEN Fault	Condition	Possible Cause	Action
CLOSED	CLOSED	Normal operation	Mains present Battery healthy	None (No fault)
OPEN	CLOSED	Standby Mode	Mains lost Battery driving load	Investigate loss of mains
CLOSED	OPEN	Fault Present	Blown fuses Battery fault Internal fault Lid tamper activated	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

CONNECTIONS

MAINS INPUT IEC C14 Socket
2m UK mains Lead supplied
ON/OFFF switch with 10A Fuse Protection

UPS OUTPUT IEC C13 Outlet
No extension lead supplied

MAINS FAULT Mains Input Lost

GEN FAULT UPS or Tamper Fault

INSTALLATION INSTRUCTIONS

This unit is only suitable for installation as permanently connected equipment. The 4HR-UPS is suitable only for indoor installation. This unit must be fed from a mains power source having a separate (approved) disconnect device suitable for the installation site and fitted with a fuse or other over-current protection device rated at 5A maximum. Ensure that the disconnect device used has appropriate earth fault protection to the applicable standard.
EQUIPMENT MUST BE EARTHED. Before installation, ensure that on/off switch is *OFF*.

The PSU should be installed according to all relevant safety regulations applicable to the application.

4HR-UPS™ 19" Rack Mounting

1) Mount securely in correct orientation ensuring suitable rack, fixings and supports are used to suit the weight of the product with batteries installed
2) Ensure appropriate access is possible for future battery maintenance
3) Use IP66 bushes and cable glands rated to UL94 HB minimum.

Mains Power Up

4) Attach supplied power cord or correctly rated mains cord (minimum 0.5mm^2 [3A], 300/500Vac). Connect other end to 230Vac socket and Turn mains switch on – the switch should illuminate.
5) Check PSU Green Mains LED is ON. Check Inverter Blue LED is ON (check switch is in ON position).

Load Output

6) Connect correctly rated v or extension lead to UPS output and connect CCTV devices.
7) Check PSU Module Green Mains LED is ON. Check Inverter Blue LED is on. Check connected device power LED is ON.
8) NOTE: Yellow Fault LED on internal PSU module may flash to indicate no battery has been connected. This is normal.
9) Verify PD is operating correctly.
10) Turn power switch to off position and disconnect load output power strip

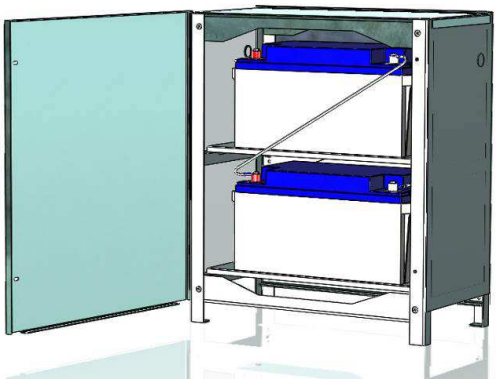
PSU Module Signalling Outputs

11) Connect EPS and GEN fault outputs to appropriate inputs of control equipment (if used).

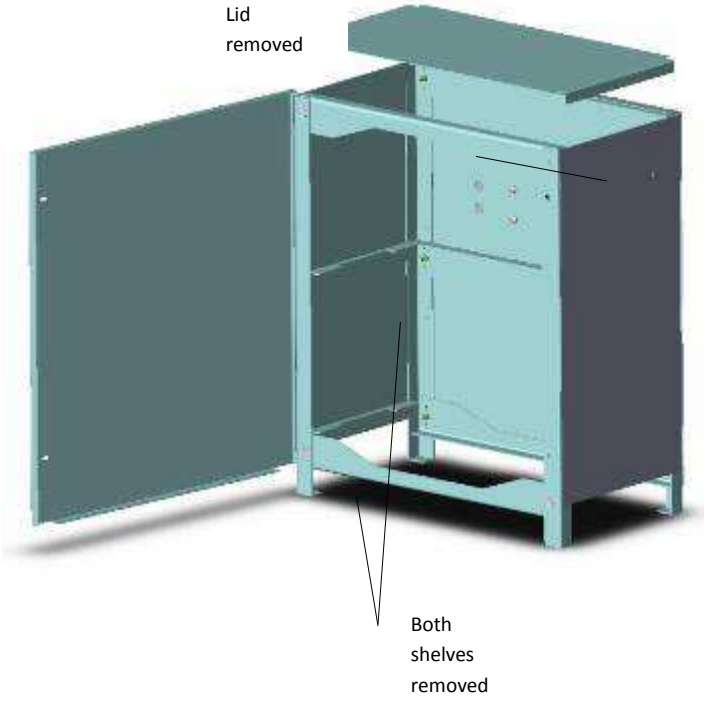
Standby Battery – 2x 18Ah Battery Compartment

12) Remove battery compartment cover, if not already done so
13) Attach supplied battery cables to batteries. NOTE: ensure correct polarity!
    Red lead to +ve of battery 1, Black lead to -ve of battery 2.
    Connect -ve of battery 1 to +ve of battery 2 using short link lead provided
14) Turn mains switch to on. Check Green Mains LED is ON and Blue Inverter LED is ON
15) Note – an internal amber PSU LED will flash, signalling battery charging for at least 24 hours from when the mains is applied – this is normal.
16) Turn the mains switch to off. Check PSU Module Green Mains LED is OFF. Check Blue Inverter LED is on and Red Standby operation LED is on.
    NOTE: Batteries must have sufficient charge to supply the load
17) Turn mains switch to On and reconnect output power strip and connected devices still have power.
18) Check Green Mains LED is ON. Check Blue Inverter LED is on. Check connected devices power LED is ON.
19) Turn the mains switch to off. Check PSU Module Green Mains LED is OFF. Check Blue Inverter LED is on and Red Standby operation LED is on and connected load remains powered.
20) Turn Mains switch to ON. Commission complete.

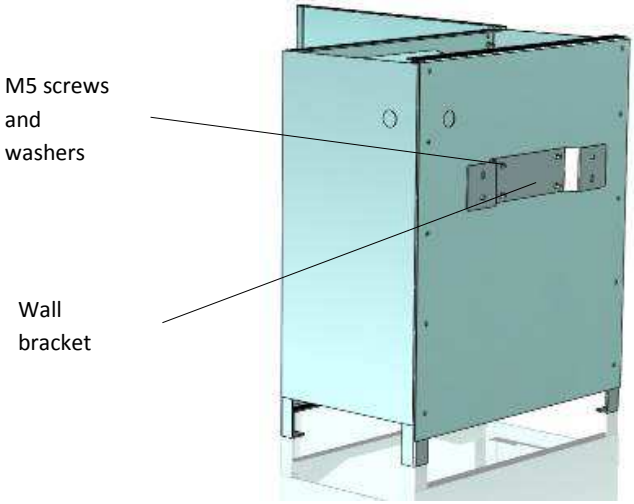
FLOOR STANDING BATTERY CABINET ASSEMBLY AND USE

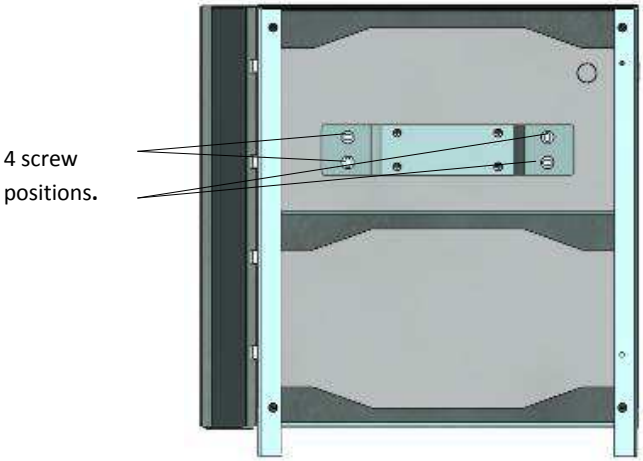


1) Remove the battery box from the packaging.
2) Remove the shelves.
3) With the door open, remove the lid.

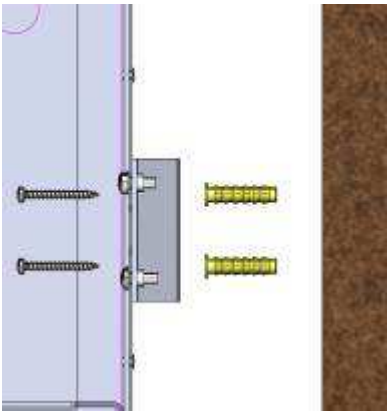


4) If not fitted, install the wall mounting bracket to the rear panel, using 4 off M5 pan head screws and plain washers



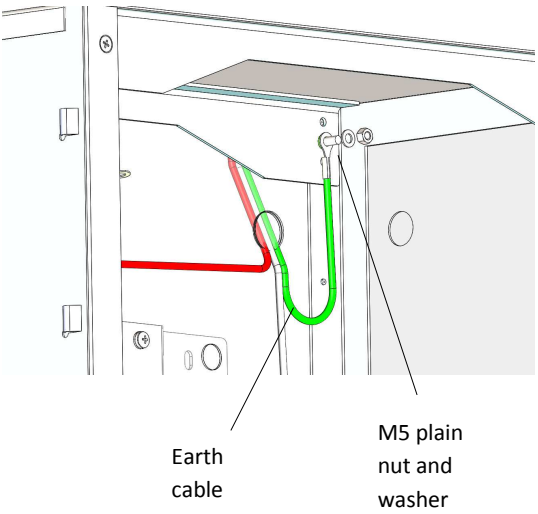


5) Position the case in its installation position.
6) Spot through 4 fixing screw positions.
7) Withdraw the unit, and fit required plugs as appropriate.
8) Reposition the unit, and secure with appropriate fixing screws.



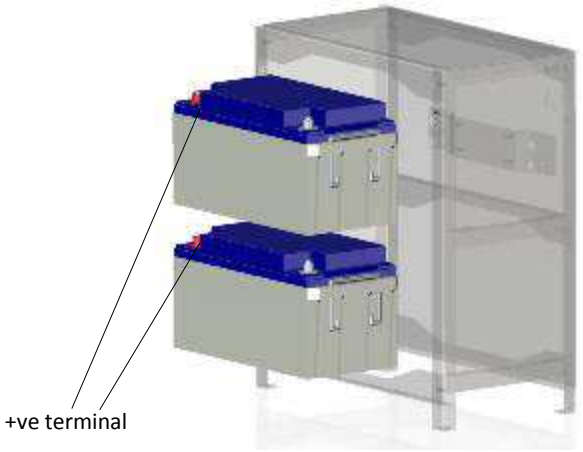
BATTERIES AND CABLE INSTALLATION

9) Remove knock outs on either the side or rear of the case.
Earth cable:
10) Connect the earth (green and yellow) lead in the 3 metre cable to the top right hand (interior) fastener as shown.
11) Use a M5 washer and M5 plain nut
12) Ensure the abutting face on the rivet nut is free from paint.

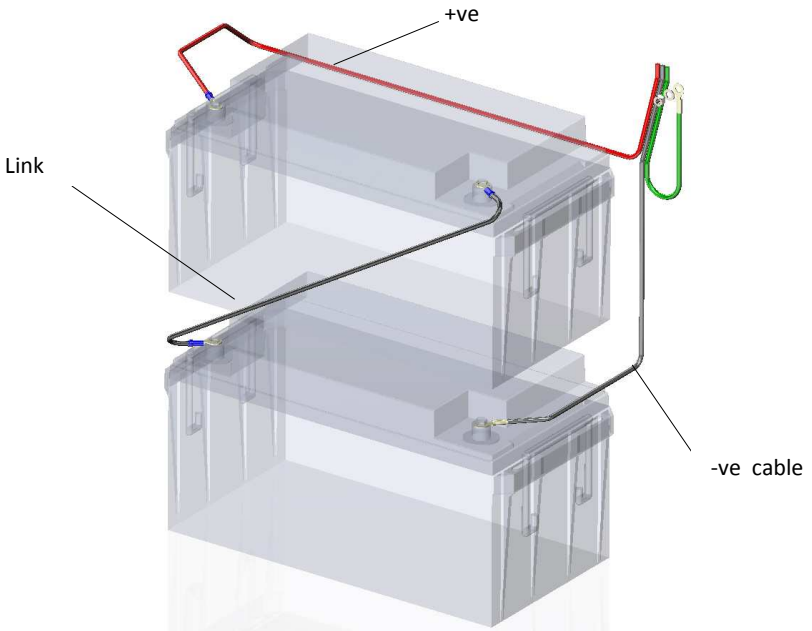


13) Replace both shelves in the case.

14) Install the batteries in the orientation shown, with the terminals to the front, and the positive terminal to the left hand side.



15) Fit positive and negative ends of 3m cable to the batteries as shown (crimped ring terminals):



16) Route the positive (red lead) of the 3m cable to the positive terminal of the upper battery

17) Route the negative (black) lead of the 3m cable to the negative terminal of the lower battery

18) Connect the black 600 mm link cable to the negative terminal of the upper battery

19) Connect the other end of the black link wire to the positive terminal on the lower battery.

20) For connection to the power supply, refer to the relevant installation instruction

21) Replace the lid and secure the door shut with the 2 off M4 screws and washers.

OPERATING INSTRUCTIONS

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

The Front LED window will illuminate and to show the status of the outputs. In the event of a PSU fault condition, an internal Yellow Fault LED will be illuminated and the fault outputs will open.

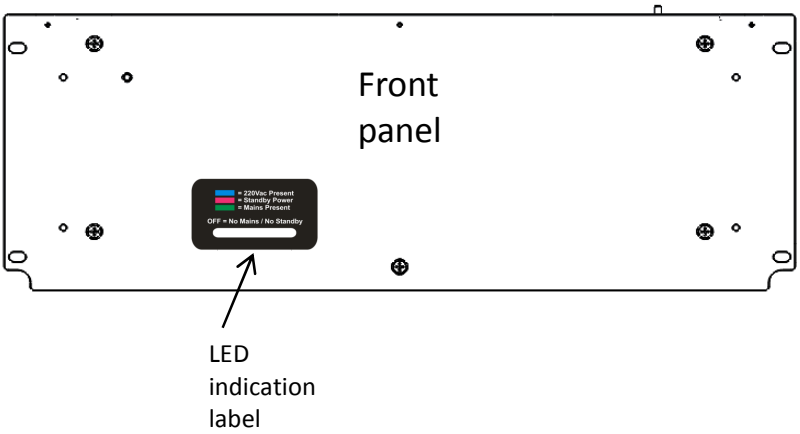
An internal Amber Battery Charging LED will be illuminated when the batteries is not fully charged and is charging normally. When the battery is fully charged, this LED will be extinguished.

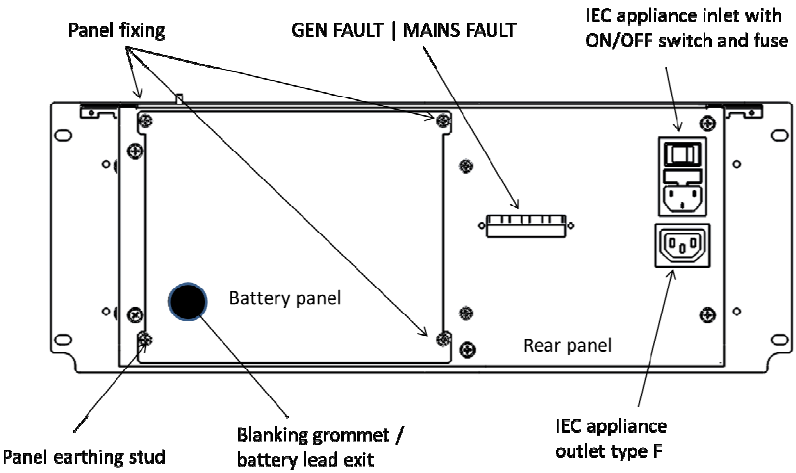
MAINTENANCE

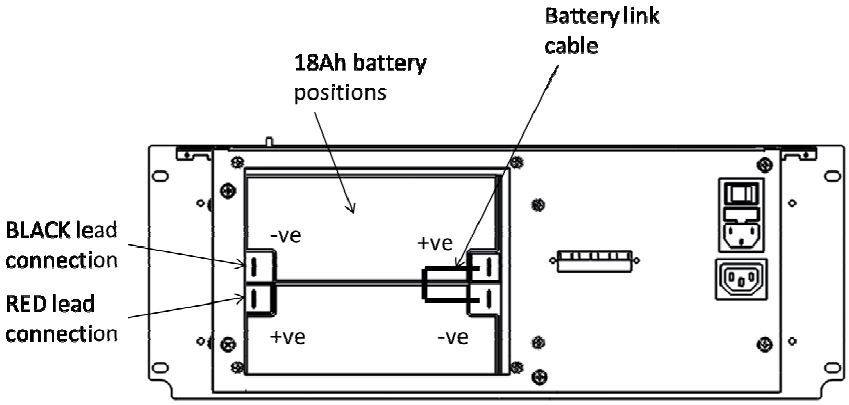
There is no regular maintenance required of the unit other than periodic testing and replacement of the standby batteries.
Reference should be made to the battery manufacturer's documentation to determine typical/expected battery life with a view to periodic replacement of the battery.

If the output of the unit fails the cause of the failure should be investigated e.g. short circuit load. The fault should be rectified before restoring power to the unit. If fuses need to be replaced ensure the correct fuse rating and type is used.

PRODUCT IMAGES

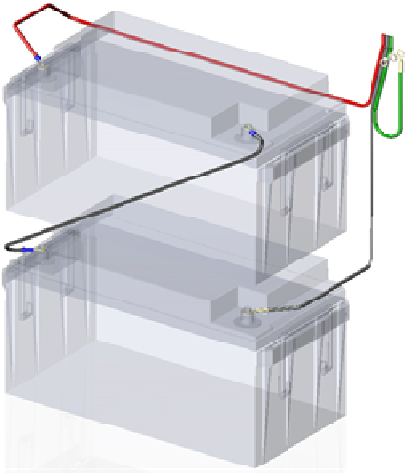






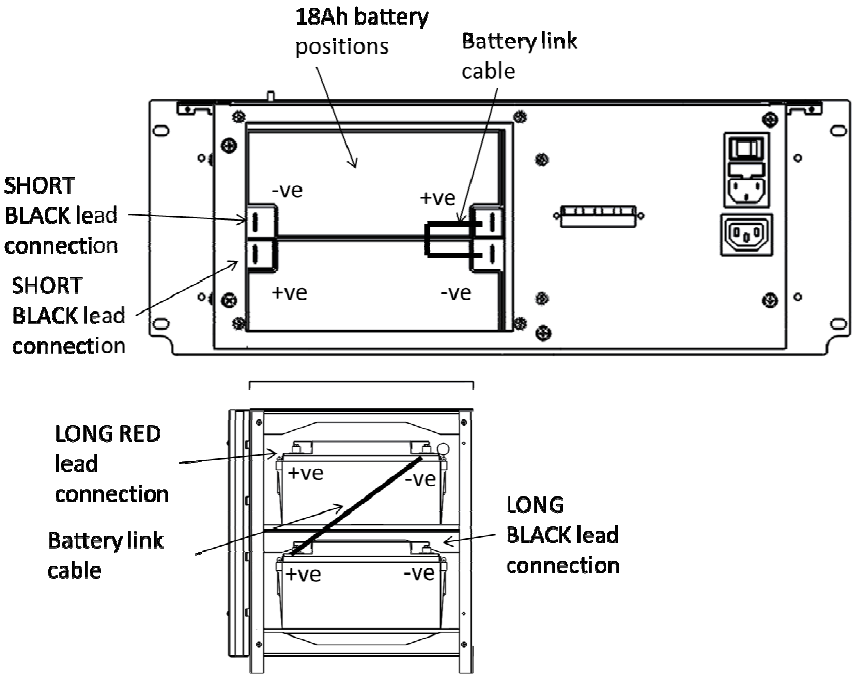
2X BATTERY WIRING DIAGRAM FOR 8CAM

WARNING: ALWAYS FIT 2 BATTERIES and wire in series, the product will NOT work with a single 12 V battery



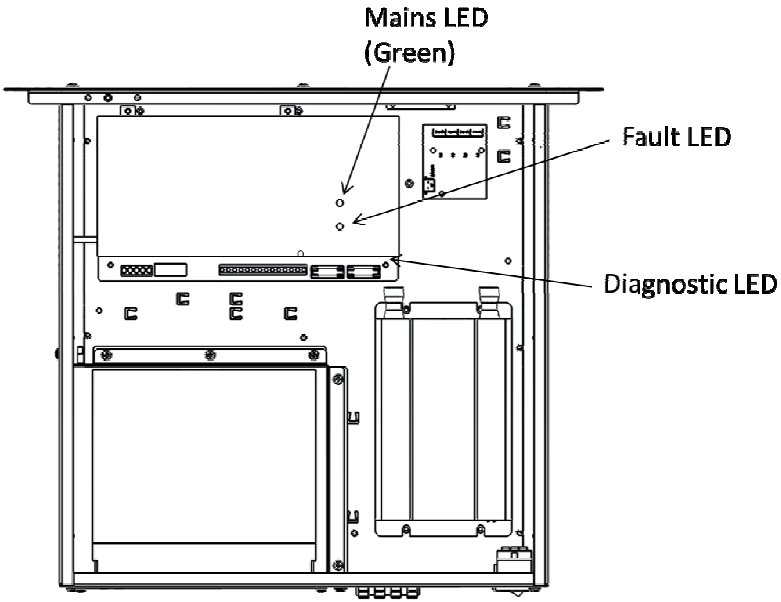
2X BATTERY WIRING DIAGRAM FOR 16/32CAM

WARNING: ALWAYS FIT 2 BATTERIES (2x 12V 38Ah or 2x 12V 65Ah) and wire in series, the product will NOT work with a single 12 V battery



4X BATTERY WIRING DIAGRAM FOR 16/32CAM

WARNING: ALWAYS FIT BATTERIES IN PAIRS (2x 12V 38Ah or 2x 12V 65Ah + 2x 12V 18Ah) and wire in accordance with this diagram, the product will NOT work with less than 4 batteries



Position of internal PSU LEDs fault and diagnostics

INTERNAL PSU MODULE LOCAL INDICATORS

MAINS LED (GREEN)	FAULT LED (YELLOW)	CHARGE LED (ORANGE)	STATUS
ON	OFF	OFF	NORMAL - battery fully charged
ON	OFF	ON	NORMAL - battery charging
ON	1s ON, 1s OFF	ON or OFF	FAULT - see Signalling Outputs
OFF	0.1s ON, 3s OFF	OFF	FAULT - Mains Loss PSU operating on battery standby
OFF	OFF	OFF	FAULT - No Output Mains and Battery loss

Fault Diagnostic table – Internal diagnostic LED – Service Engineer use only

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

INVERTER LOCAL INDICATORS

POWER LED (GREEN)	FAULT LED (RED)	STATUS
ON	OFF	NORMAL
ON	ON	FAULT – Check: Environment temperature is not too high Check the load power is not too high Check for short circuits and remove
OFF	OFF	FAULT - Mains Loss, Check Battery condition

AUDIBLE ALARM	FAULT CONDITION	WHAT TO CHECK
ON	Low Battery Voltage Overload Condition High Internal Temperature Short Circuit	Mains is on, battery condition UPS is suitable for System load Environmental temp is below 40°C Output Power strip for damage

COMPLIANCE

This power supply unit meets the essential requirements of the following European Directives:

Low Voltage: 2014/35/EU EMC: 2014/30/EU

WEEE: 2012/19/EU RoHS2: 2011/65/EU

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 2013/56/EU (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 wheelie bin symbol, which may include lettering to indicate cadmium (Cd), lead (Pb), or mercury (Hg).

For more information see: www.recyclethis.info

Explanation of symbols: *(Not all may apply)*


Fault Indication


Mains Present


Shock Risk - isolate before attempting access


Protective Earth


Certification Level


Do not dispose of in unsorted waste

Specifications subject to change without notice

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