DISPLAY INSTRUCTIONS



LCD Display

Start Up Procedure

 Ensure all the batteries are connected and the input and output cables are connected and remove the output fuse. Switch on the mains supply, the unit will start up automatically. The LCD display should show the battery charging and the load fed from the mains.
Allow a few seconds until the output voltage is stable, now connect the load by inserting the output fuse into the output terminal block. Always check there is no voltage coming back down the output cables before connecting them into the unit.

Shutdown Procedure:

- 1) Remove the output fuse from the terminal block
- 2) Press the Off Button on the LCD Display
- 3) Switch off the mains supply
- 4) Disconnect the batteries with care, do not short circuit
- 5) Note the unit contains electrical storage devices which remain charged for a considerable time

Testing Procedure:

a) Ensure all the load is connected to the Inverter Unit, if some slave fittings are fed through changeover or hold off relays switch off the test key to isolate the mains supply.

b) With all the load connected switch off the Mains Supply to the Inverter Unit, there should be 4 beeps and the LCD display will show the inverter being fed from the battery to the load. The Amber Inverter LED will also be on.

c) Allow the inverter to run for the duration of the test required, now restore the mains supply the LCD display will show the load being fed from the main and the battery charging. The Green Line LED will also be on.

d) The charger will continue to charge the battery until 100% capacity is displayed.

e) If a mains failure lasts longer than the unit's capacity and the level of the battery drops below 85% the unit will beep every second and go into low voltage cut off. This prevents the battery from going into deep discharge. If this happens during a discharge test before the full duration, the batteries may need replacing.

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Fig. 2 Maintained Continuous Operation.



CONNECTIONS:

a) Permanent Supply

Connect a permanent 230V 50Hz supply from the lighting circuit which requires monitoring

b) Switched Supply

For maintained operation a switched live should be connected to the SL connection on the Switched Supply terminal

c) Inverter Output

230V 50Hz Output to emergency lights

NOTE: All incoming supplies and the inverter supply must be fed from the same phase.

CONNECTIONS:

a) Permanent Supply

Connect a permanent 230V 50Hz supply from the lighting circuit which requires monitoring

b) Continuous Output

For continuous maintained operation a link should be connected to the L connection on the Permanent Supply terminal and to the SL Switched Live terminal, see diagram.

c) Inverter Output

230V 50Hz Output to emergency lights

NOTE: All incoming supplies and the inverter supply must be fed from the same phase.

CONNECTIONS:

a) Permanent Supply

Connect a permanent 230V 50Hz supply from the lighting circuit which requires monitoring

b) Inverter Output

230V 50Hz Output to emergency lights

NOTE: All incoming supplies and the inverter supply must be fed from the same phase.

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LIGHTING & SAFETY SYSTEMS



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C.O.S.H.H. HEALTH AND SAFETY INFORMATION

WARNING

FOR THE PERSONAL SAFETY OF ALL OPERATIVES WORKING WITH VENTED LEAD ACID BATTERIES.

Always wear goggles and rubber gloves, use insulated spanners and preferable protective clothing, when working on the battery or with electrolyte. Remember that the battery electrolyte is Sulphuric acid, a corrosive liquid.

A battery care card is supplied with each battery. Ensure this is displayed in a prominent position near the battery. A plastic wallet is also provided and the manual should be kept behind thebattery care card in the wallet.

Before working on the battery and after checking the battery care card, check that adequate supplies of clean cold water and saline solution are available. Saline solution should be kept in a squeeze bottle for irrigating the eyes. In the event of contact with electrolyte, the affected skin should be washed with copious amounts of clean cold water.

If electrolyte enters the eyes, they should be open and irrigated with saline solution, then doused liberally with clean cold water and then receive urgent medical attention.

Never permit smoking, sparks of any kind or flames near the battery, whether filled or empty, charged or discharged.

Remember that the battery cells may contain explosive gases.

Remember that the battery is electrically live at all times and cannot be isolated in the conventional sense, although voltage at any point can be reduced by removal of appropriate intercell connectors. Battery room's can/or battery cabinets should be locked against unauthorised access. Take care that accidentally dropping or touching metal objects on to cell terminals will cause short circuits.



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C.O.S.H.H. HEALTH AND SAFETY INFORMATION

COMPLETED CELL/BATTERIES

Batteries are designed and manufactured so as to be safe and risk free to health when properly used. Chemical hazards however arise if batteries are misused or abused when leakage or, in extreme cases fire or explosion may occur.

Batteries as despatched by the manufacturer are not hazardous within the context of C.O.S.H.H. Regulations. Although they may contain "hazardous materials" these are contained within the battery case and hence are controlled. If batteries are damaged e.g. punctured or involved in a fire hazardous materials may be exposed and would be required to be controlled. Without liability, we suggest that hazards presented by such exposed materials may be minimised, where fire is not involved, by adequate ventilation and by suitable protective clothing, including overalls and plastic gloves. In the event of fire, breathing apparatus may be advisable and wherever appropriate the fire Brigade should of course be called without delay.

WARNING

FOR THE PERSONAL SAFETY OF OPERATIVES WORKING ON NICKEL CADIUM BATTERIES

Always wear goggles and rubber gloves, use insulated spanners and preferable protective clothing, when working on the batteries or electrolyte. Remember that the battery electrolyte is a corrosive alkali (potassium hydroxide solution). Before working on the battery, check there is are adequate supplies of clean cold water and saline solution available. Saline solution should be kept in a squeeze bottle suitable for irrigating the eyes In the event of contact with electrolyte. Affected skin should be washed with copious amounts of clean cold water. If electrolyte enters the eyes, they should be held open and irrigated with soline solution and the doused liberally with clean cold water. **In all cases seek urgent medical attention.**

Never permit smoking, sparks of any kind of flame near the battery, whether filled or empty, charged or disposed.

Remember that the battery cells may contain explosive gases.

Remember that the battery is electrically live at all times and cannot be isolated in the conventional sense, although voltage at any point can be reduced by removal of appropriate inter-cell connectors. Steel cell containers must be considered "live". Battery rooms and/or battery cabinets should be locked against unauthorised personnel. Take care that accidentally dropping or touching metal objects on to cell terminals, or between steel cased cells will cause short circuits.

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LIGHTING & SAFETY SYSTEMS

C.O.S.H.H. HEALTH AND SAFETY INFORMATION

HEALTH AND SAFETY INFORMATION FOR STANDBY POWER BATTERIES

DESCRIPTION: LEAD ACID STANDBY POWER BATTERY INTENDED USE: POWER SOURCE COMPOSITION

i) PLATES AND ACTIVE MATERIAL Lead and lead compounds with small amounts of Arsenic, Antimony, Calcium, Tin and Aluminium, depending on the battery type - See Below

ii) PILLARS As above, but some types have copper or brass inserts.

iii) CONNECTORS As above, but some types have lead plated copper or pure copper connectors.

iv) BOXES, LIDS AND SEPERATORS ETC. Various types of inert plastics and glass fiber mat.

v) ELECTROLYTE Sulphuric acid — See Sulphuric Acid Data Sheet

LEAD AND LEAD COMPOUNDS

Lead and its compounds can be toxic if ingested or if dust containing them is inhaled. However, the lead and lead compounds (and the other traces of additives) are well contained within the battery and are in a wet dust free condition. It is essential that the battery cells should not be dismantled under any circumstances and as such, the possibility of lead is absolutely NEGLIGIBLE.

Because of the small amounts of Arsenic and Antimony in some types of batteries (flooded types, TAP, TSP, TEP, YAP, YHP, FAP, And R range products) there is a chance of Arsine or Stibine may be given off during charging. However, it should be stressed that the concentrations of the gases are nealigible and do not present any risk to health, and their presence is mentioned merely for completeness. For further guidance on Arsine and Stibine consult Guidance Notes EH11 and EH12 prepared by the Health and Safety Executive entitled "Arsine/Stibine, Health and Safety precautions".



C.O.S.H.H. HEALTH AND SAFETY INFORMATION

SULPHURIC ACID DATA SHEET

TOXICOLOGY: Contact with the body results in the rapid destruction of soft tissue, severe burns and repeated contact with dilute solution may cause dermatitis.

OCCUPATIONAL EXPOSURE LIMIT: lmg/m3 (8 hour time weighted average) (EH4O!90).

CLASSIFICATION: Corrosive substance (1830)

PROTECTIVE CLOTHING MUST BE WORN WHEN CARRYING OUT WORK ON/WITH THE BATTERIES

EYES: Goggles giving total eye protection should be worn (BS2092).

HANDS: Suitable acid resistance gloves e.g. PVC

BODY: Suitable acid resistance apron and rubber boots.

EMERGENCY ACTION

INHALATION OF MIST: Remove from exposure to fresh air.

SPLASH ON EYE: Irrigate with copious amounts of water or eye wash solution.

SPLASH ON CLOTHES OR BODY: Drench affected area with water and if necessary, remove contaminated clothing.

DO NOT neutralise acid whilst in contact with the skin.

INGESTION

Drink copious amounts of water or some milk of magnesia. DO NOT INDUCE VOMITING. Following emergency action, obtain Medical Advice/attention as soon as possible.

SPILLAGES

Neutralise as soon as possible using an alkali e.g. Soda Ash. Sodium Carbonate, Sodium Bicarbonate, and flush away to a drain with large amounts of water

FIRE FIGHTING

Use carbon dioxide or dry powder extinguishers. DO NOT USE WATER OR WATER SPRAY EXTINGUISHERS.

MISC HAZARDS

Due to the violent action that occurs when water is added to acid, it is recommended that when preparing any acidic solutions, the acid should be slowly added to the water.

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LIGHTING & SAFETY SYSTEMS

C.O.S.H.H. HEALTH AND SAFETY INFORMATION

1) ELECTROLYTE SULPHRIC ACID

The electrolyte in the batteries is dilute Sulphuric acid, which is both corrosive and poisonous, and consequently great care should be taken when handling the battery units or the acid. In some circumstances minute droplets may be evolved during charging. A data sheet on the general handling of Sulphuric acid (in bulk form) is on the previous page. However, when the acid is contained within the battery, the level of protection necessary to be taken will depend on the likelihood of contact with any acid. For example, if there was a slight chance that splashes could occur to the body or face, whilst handling the batteries, suitable protective equipment should be donned, whereas it would seem unnecessary to don similar equipment, when direct contact with or disturbance of the battery does not occur. It should be noted that there is negligible chance of any escape of acid (or gases) from the recombination electrolyte type cells since these are effectively "sealed".

2) HANDLING

Most batteries are heavy and awkward to handle and consequently great care should be taken and the correct technique should be employed whether using manual or mechanical lifting methods. The battery should always be kept upright to avoid the spillage of acid. Only distilled water should be used for topping-up as other substances may cause a dangerous reaction — DO NOT overfill. Ensure that the batteries are maintained in a clean, dry condition to avoid the possibility of corrosion and short circuiting developing.

3) GASES

A mixture of Hydrogen and Oxygen is emitted during charging, which may also be emitted if the battery is shaken. The gases may produce an explosive mixture in the atmosphere if the concentration of the Hydrogen exceeds 4% and consequently, the following precautions must always be taken.

Always charge the batteries in well ventilated areas. No smoking or naked flames should be permitted in the charging area or elsewhere during the installation, inspection or any other work on the batteries. Notices to this effect should be posted in key locations. Always switch off the circuit before connecting or disconnecting the battery otherwise a spark may cause an explosion.

4) FIRE HAZARD

High currents may be generated if the terminals of the battery are short circuited by a conductive object, which may cause the object to get very hot and in addition, sparks and melted metal may be ejected It is therefore essential to prevent conductive objects touching across the terminals and consequently the following precautions should be observed Before working on a battery, remove all metallic items from hands, wrist, neck etc. (e.g. rings, watches, necklaces), or other miscellaneous items that may fall from pockets.

- Always use insulated tools and spanners with open ends.
- Do not place tools or other metallic objects on top of batteries.
- Switch off units before any connections or disconnections are made to the Batteries.

The boxes and lids are made from various types of plastic components, which under normal usage are inert. In the case of fire, the plastic components could decompose and may give off toxic vapors and consequently suitable respiratory protection should be used during fire fighting.

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C.O.S.H.H. HEALTH AND SAFETY INFORMATION

5) REPAIRS / DISPOSAL

As stated earlier, although the batteries contain lead and small amounts of antimony and arsenic, they are completely safe if handled according to the accompanying guidelines. The battery cells should never be dismantled as this operation may involve several potential hazards, which are best handled under controlled conditions, using specialised equipment. No attempt should be made to repair any batteries and they should be treated as throw-away units once they have outlived their use, except where any repairs are to be done, by qualified personnel, on plant type plates for example.

The batteries must be disposed of in accordance with all relevant waste disposal and pollution legalisation and in particular according to:

- The Control of Pollution Act 1974
- The Control of Pollution (Special Waste Regulations) 1980

Contact your local Authority Environmental Health Department for guidance on the disposal of **batteries**



C.O.S.H.H. HEALTH AND SAFETY INFORMATION

FAULT FINDING CHART	MAINS FAILURE	>								A
	FUSE BLOWN	>	>							B
	FAULTY CONTROL PCB	>		>	>		>			C
	FAULTY RECTIFIER	>			>					٥
	OPEN CIRCUIT	>	>		>		>	>	>	Е
	FAULTY CONTRAC- TOR		>							L.
	MANUAL BOOST ON CONTINU- OUS			>		>				U
	FAULTY BATTERY	>	>		>					т
	FAULTY METER							>		н
	FAULTY TIMER								>	т
		NO CHARGE	NO OUTPUT	O/P VOLTS HIGH	o/P VOLTS LOW	LOW ELEC- TRO-LYTE	NO CURRENT LIMITING	NO METER READING	NO TIME DELAY	CORRECTIVE ACTION

P.C: PROBABLE CAUSE

A) RESTORE MAINS SUPPLY

B) REPLACE FUSE AFTER RECTIFYING FAULT C) REPAIR OR REPLACE CHARGE CONTROL CIRCUIT BOARD G) TOP UP CELLS & ENSURE MANUAL BOOST IS OFF D) REPLACE FAULTY RECTIFIER / POWER MODULE

SYM: SYMPIOMS

E) REPAIR FAULTY OR LOOSE CONNCECTION F) REPAIR OR REPLACE H) REPLACE

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C.O.S.H.H. HEALTH AND SAFETY INFORMATION

SEALED LEAD ACID CELLS

SEALED LEAD ACID CELLS Design Life: 5 or 10 years Charge Current 10% of battery capacity < 60Ah ie: 60Ah divided by 10 = 6 Amps Charge Current 12.5% of battery capacity > 60Ah ie: 90Ah divided by 12.5 = 8 Amps Float Charge Voltage per cell at 20-25oC: 2.25v Charger Type: Constant Potential only (Must not be fitted to systems with Boost Charge)

VOLTAGE SETTINGS						
Nom. Volts	Float Volts					
12	13.50					
24	27.00					
48	54.00					
108	121.50					

* In warmer environments the battery life will be reduced, this can be counteracted to some extent by reducing the charge voltage

What to inspect	Method	Standard Spec	Measures in case of irregularity	
Total Battery Voltage During Floating Charge	Measure total battery voltage by voltmeter of class 0.5	Total battery voltage Refer to table above VOLTAGE SETTINGS	Adjust if voltage value is outside standard	
Individual Battery Voltage During Floating Change	Measure total battery voltage by voltmeter of class 0.5 or better	2.25V per cell *If room temperature is 20-25°C	Contact Supplier for remedy	
Battery Terminations	Check for damage or leak- age of container and cover		If loose, tighten using insulated spanner	
Appearance	Check for contamination by dust etc.		If leakage is found verify the cause. If the container or cover is cracked, then the battery should be replaced	
	Check for contamination by dust etc,		If contaminated, clean with wet cloth	
	Check for corrosion in the cubicle, battery stand, con- necting wires & terminals		Perform cleaning, rust preventive treatment, painting or touch up	

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