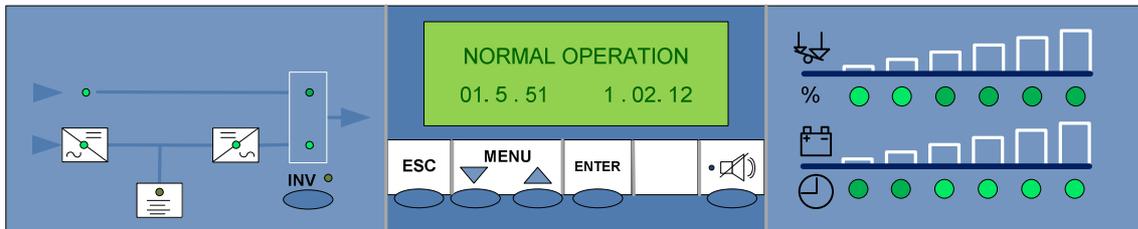




DIRECT MAINTENANCE  
CONTROL COMPANY

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# UPS OPERATING PROCEDURES 10 COLSTON AVENUE APRIL 2015



Date.....
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## 1. Introduction

The Liebert Hipulse E Uninterruptible Power Supply (UPS) System is connected between a critical load, such as a computer, and its three phase mains power supply. Being designed to furnish a well regulated 3 phase output power supply under all rated load and input supply conditions, the system offers the user the following advantages: Increased power quality: The UPS has its own internal voltage and frequency regulators which ensure that its output is maintained within close tolerances independent of voltage and frequency variations on the mains power lines. Increased noise rejection: By rectifying the input a.c. power to d.c. power, and then converting it back to a.c., any electrical noise present on the input mains supply line is effectively isolated from the UPS output, therefore the critical load sees only clean power.

Power blackout protection: If the mains power fails, the UPS continues to power the critical load from its battery source, leaving the load immune from power disturbances.

### Design Concept & Introduction

This section describes an individual module's operating principles. The UPS basically operates as an a.c. -d.c. -a.c. converter (see figure 1). The first conversion stage (from a.c. to d.c.) uses a 3 phase, fully-controlled SCR bridge rectifier to convert the incoming mains supply into a regulated d.c. bus-bar.

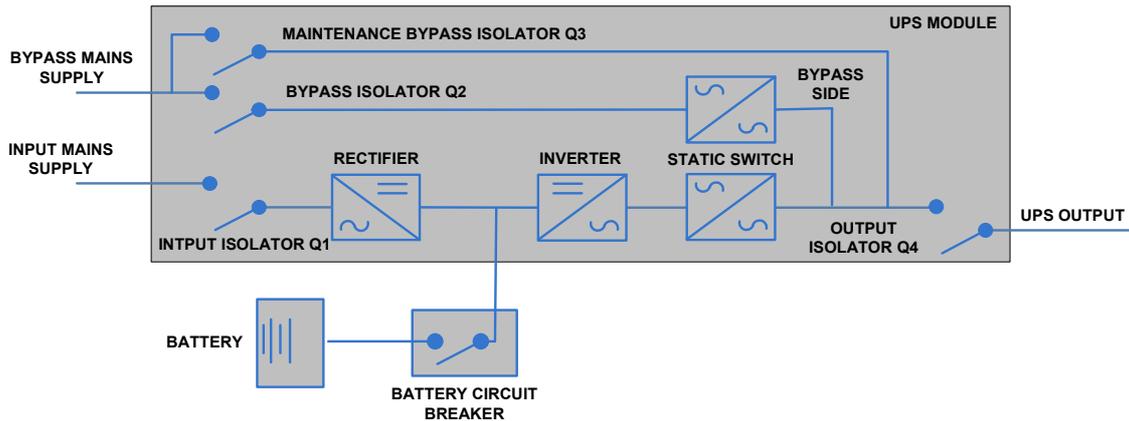
The d.c. bus-bar produced by the rectifier provides both battery charging power - being equipped with a temperature compensated battery charging system, to prolong battery life - and power to the inverter section - which utilizes the latest IGBT switching pulse width modulation ( PWM ) design - and provides the second conversion phase, i.e. reconverting the d.c. bus-bar voltage back into an a.c. voltage waveform.

During normal operation both the rectifier and inverter sections are active and provide regulated load power whilst simultaneously float charging the battery. In the event of a mains power failure, the rectifier becomes inoperative and the inverter is powered solely from the battery. Critical load power is maintained under these conditions until the battery is fully discharged, whereupon the UPS shuts down. The end of battery discharge is assumed when the battery voltage falls below a preset value (i.e. 330V d.c. for a 400V a.c. system). The period for which the load can be maintained following a mains power failure is known as the system's 'Autonomy Time' and is dependent upon both the battery A/Hr capacity and the applied percentage load.

### Bypass supplies

The circuit block annotated 'Static Switch' in figure 1 contains an electronically controlled switching circuit which enables the critical load to be connected either to the inverter output or to a bypass power source via the 'static bypass line'. During normal system operation the load is connected to the inverter and the 'inverter-side' of the Static Switch is closed; but in the event of a UPS overload, or inverter failure, it is automatically transferred to the static bypass line.

Figure 1



To provide a clean ( no-break ) load transfer between the inverter output and static bypass line, the static switch activates connecting the load to the bypass supplies. To achieve this, the inverter output and bypass supply must be fully synchronized during normal operating conditions. This is achieved through the inverter control electronics which make the inverter frequency track that of the static bypass supply provided that the bypass remains within an acceptable frequency window. The synchronizing window is pre-selected to 2% of nominal frequency, giving an acceptable frequency window  $\pm 1$  Hz. A manually controlled, 'maintenance bypass' supply is also incorporated into the UPS design. Its purpose is to enable the critical load to be powered from the mains bypass supply while the UPS is shut down for routine maintenance.

Note: The load equipment is not protected from normal supply aberrations when operating on Bypass side or in the maintenance bypass mode

### System Control Philosophy

#### Normal operation

During normal operation, i.e. when the UPS input supply is present and within specification, both the rectifier and inverter sections are active and the static switch is turned on to connect the inverter output to the critical load busbars. The battery circuit breaker is also closed and the battery is therefore permanently float charged at the d.c. busbar voltage level.

#### Mains Failure

If the power mains has a failure or is out of tolerance the rectifier will stop automatically, while the Inverter will continue to operate on power from the battery for a period of time which depends on the load and the capacity of the battery. If the mains supply has not returned within this time, the Inverter will stop automatically and an alarm message will appear on the UPS operator control panel display. Critical load will not be interrupted in the event of a drop or return of the AC power mains.

#### Return of power mains

When the mains returns within the required tolerance, the Rectifier will start up again automatically and gradually (power walk-in), supply power to the Inverter and recharging the battery at the same time. There will be no interruption of the critical load.

### **Input Power Walk-in**

The rectifier/charger provides a feature that limits the total initial power requirements to 20% of rated load and gradually increases power up to 100% of full rating over an hardware selectable time (slow or fast).

### **Off-Battery**

If the battery system only is taken out of service for maintenance, it is disconnected from the rectifier/charger and inverters by means of (an) external disconnect breaker(s). The UPS shall continue to function and meet all of the specified steady-state performance criteria, except for the power outage back-up time capability.

### **Power Walk-in delay timer**

On 1+N parallel systems, it is possible to select the start of each UPS after a power failure, by setting a suitable time from the operator's display (ranging between 0 and 120 seconds). This function is particularly useful when a generator is present on the input side because it enables to acquire power gradually.

### **UPS Module fault**

In the event of an Inverter fault, the Static Transfer Switch will automatically transfer the load onto the bypass mains with no interruption. In such an event, request qualified technical assistance. The load will be transferred with no interruption if the Inverter is synchronised with the mains; if this is not the case, there will be an interruption lasting about 20 msec.

### **Overload**

In the event of an overload at the Inverter output which lasts longer than the typical time/current (refer to Installation Manual – Specifications), the Inverter will shut down and the Static Transfer Switch will automatically transfer the load onto the bypass mains with no interruption. If the overload falls within the typical time/current that has been specified, the load will be returned to the inverter when the power drops to a level which can be supported. In the event of a short circuit in the output, the load will normally be transferred onto the bypass mains, to provide fuse clearing current capability. An alarm message will appear on the UPS operator control panel display. If the short is cleared and the the unit will return to normal inverter operation. However in the event that an overload condition is sustained for greater than a preset time, the load will remain on the bypass supply. Additionally, if several overloads occur within a preset time, the unit will lock into static bypass until manually reset.

### **Maintenance Bypass**

A second bypass circuit contained in the UPS cabinet, identified as the 'Maintenance Bypass' line is included to enable a 'raw' mains supply to be made available to the load while facilitating a safe working environment for carrying out scheduled UPS system maintenance or trouble shooting

## Operating Instructions

### 2. Introduction

The UPS can be considered to be in one of following operating conditions:

- **Normal operation** - All relevant power switches and circuit breakers closed, the load is powered by the UPS.
- **On Maintenance Bypass** - UPS shut down but the load connected to the unprotected mains via the Maintenance Bypass Supply line.
- **Shutdown** - All power switches and circuit breakers open - no load power.
- **On Static Bypass** - The load power is supplied through the mains static bypass line. This may be considered as an intermediate operating condition being utilized for the purpose of load transfers between inverter and maintenance bypass or supply under abnormal operating conditions.
- **ECOMODE** – All relevant power supply switches and the battery switch are on, and the load is fed by the Bypass Mains through the UPS Static Transfer Switch, while the Inverter remains on stand-by.

This chapter contains instructions which enable you to switch between the above conditions, to carry out a RESET and how to switch ON\OFF the inverter, etc.

#### 2.1 General notes

**Note 1:** All the user controls and indicators (led) mentioned in these procedures are identified in Chapter 8 of the manufacturers manual.

**Note 2:** The audible alarm may annunciate at various points in these procedures. It can be cancelled at any time by pressing the 'Alarm Reset' push-button.

**Note 3:** The Liebert Hipulse E UPS System incorporates an optional automatic boost charge facility which can be used in systems containing conventional flooded lead-acid batteries. If this type of battery is used in your installation you may notice that the battery charger voltage may be greater than its nominal (432V d.c. for 380V a.c., 446V d.c. for 400V a.c. and 459V d.c. for a 415V a.c. system) when the mains supply returns from a prolonged outage. This is the normal response of the boost charge facility: the charger voltage should return to normal after a few hours.

## Power Switches

The UPS can be separated by means of power switches, mounted inside the cabinet and accessible after opening the front door, which has a key. The location of the UPS power switches is shown in Figs. 2.

The UPS module power switches are:

Q1 - Input Isolator: connects the UPS with the mains supply.

Q2 - Bypass Isolator: connects the UPS with the bypass supply.

Q3 – Maintenance Bypass Isolator (padlocked) permits supply of the load directly by the bypass line for maintenance of the UPS module.

**The internal maintenance bypass must not be used when the UPS system is comprised of more than two UPS modules in parallel.**

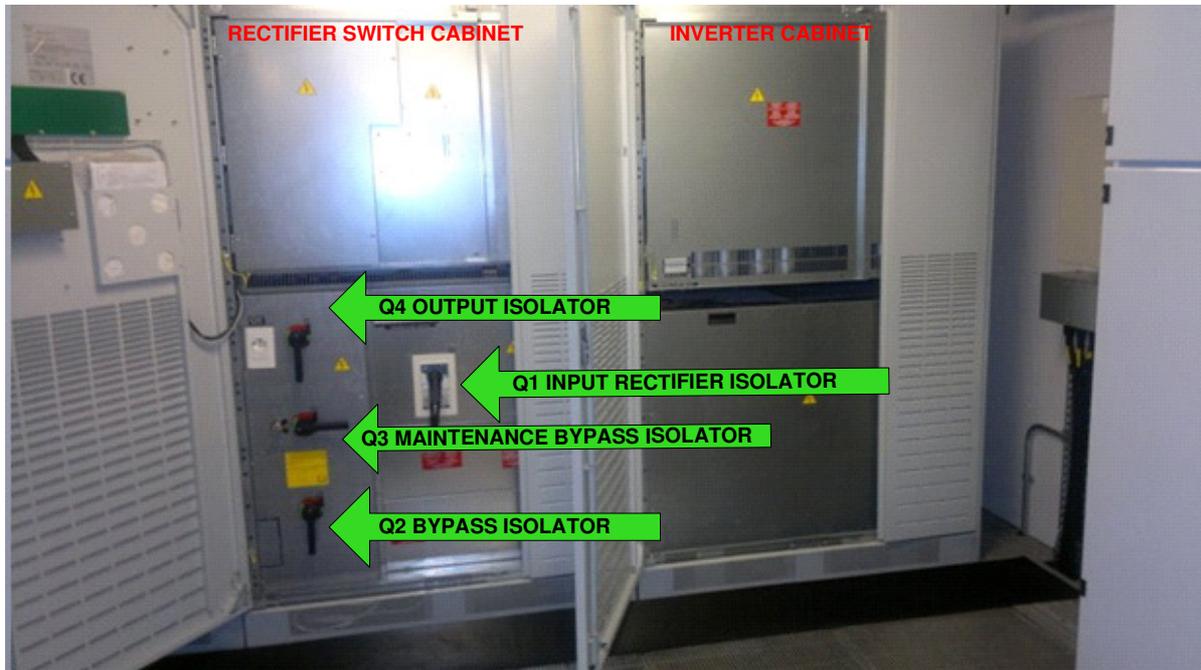
Q4 - Output Isolator: connects the output of the UPS to the load.

**Note :** The battery interrupter is not expected inside of the UPS and should be installed in the proximity of the respective battery.

## Figures 2 Power Isolator Location

- Input Isolator (Q1)
- Bypass Isolator (Q2)
- Maintenance Bypass Isolator (Q3)
- Output Isolator (Q4)

### 2. UPS internal Components Figs. 2



### 3. Procedure for UPS Start-Up: without interrupting power to the load

This procedure will describe how to start the UPS and the how to transfer the load from the external maintenance bypass to the UPS inverter. It is assumed that the installation is complete, the system has been commissioned by authorized personnel and the external power isolators are closed. Refer to Figs. 1-1 for corresponding isolators Q1 to Q4.

#### ENSURE CORRECT PHASE ROTATION.

1. Close Q3 Maintenance Bypass switch and external switch (inside Maintenance Bypass) to load. (if load is on these will already be closed)
2. Close the input power switch Q1 and the Bypass power switch Q2. The rectifier will walk in and stabilise at the float voltage

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UPS

Initializing Window: after first connecting power to the UPS and closing the isolator, this message will appear on the LCD screen. It persists for about five seconds while the control firmware is loaded. It is followed by a screen showing various messages with the time and date on the bottom line. The Module Mimic indicators Bypass supply healthy ( 1 ) and after 20 seconds Load on bypass ( 6 ) will flash and red led (13) will illuminate. The Display window will show the present status of the UPS:

RECTIF. SWITCH OPEN  
 BATTERY C.B. OPEN  
 MANUAL BYPASS CLOSED  
 HH.MM.SS DD.MM.YY

**Note:** In **ECOMODE** the message 'LOAD ON BYPASS' will not appear.

3. Wait for 30 seconds and ensure the DC level is correct, then close the battery circuit breaker adjacent to the batteries. The Module Mimic indicator ( 3 ) Battery unavailable should extinguish. Several LED's on the Battery state of charge bar graph will illuminate showing the battery state of charge.
4. Close output isolator Q4
5. Open the Maintenance Bypass power switch Q3 and fit lock. The Module mimic indicator Load on bypass ( 6 ) will Flash amber. The Display window will show the present status of the UPS:

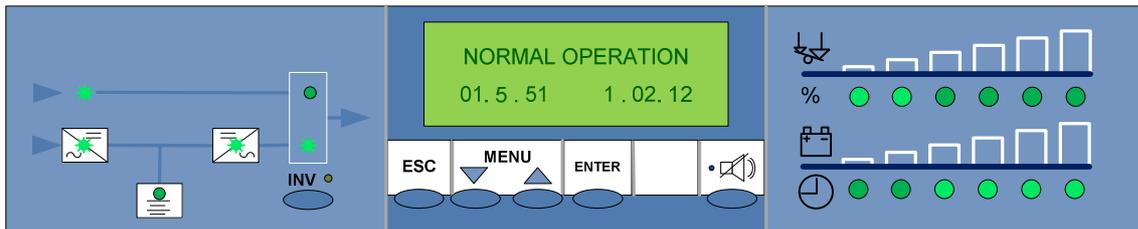
LOAD ON BYPASS  
 INV. : OFF  
 HH.MM.SS DD.MM.YY

6. After 5 seconds the Module Mimic LED's will change so that the Load on inverter ( 5 ) will light steady green and the Load on bypass ( 6 ) will extinguish. If this does not occur the inverter may have been stopped manually during the shut down procedure therefore press the inverter start button on the display mimic.

NORMAL OPERATION  
 01.5.51 1.02.12

**Note:** In **ECOMODE** the Load on Mains led (6) stays on while the Load on inverter led (5) is off. The message shown below, will be seen on the default screen whenever the UPS is operating normally:

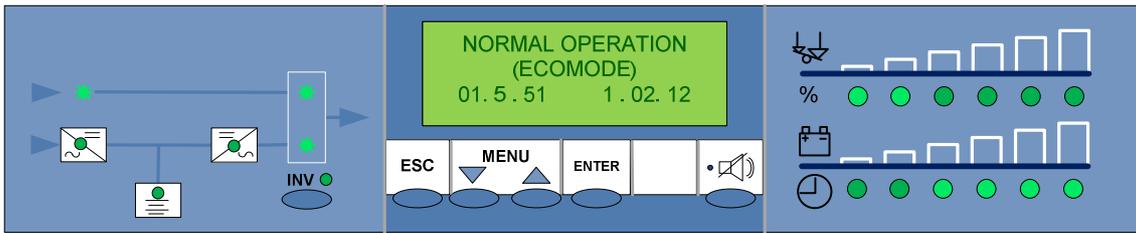
**The UPS is operating normally with its inverter supplying the load.**



**ECOMODE:** The following message will appear in the default screen whenever the UPS is operating in **ECOMODE**. The load is supplied by the Bypass Mains.

NORMAL OPERATION  
 (ECOMODE)  
 01.5.51 1.02.12

**The UPS is operating in ECOMODE with the Bypass Mains supplying the load.**



#### 4. Procedure for UPS Start-Up: without power initially supplied to the load

This procedure should be followed when turning on the UPS from a fully powered down condition - i.e. where the load is not being initially supplied at all. It is assumed that the installation is complete, the system has been commissioned by authorized personnel and the external power isolators are closed. Refer to Fig. 1-1 for corresponding isolators Q1 to Q4.

1. Open the UPS door(s) to gain access to the main power switches.

2. Close the Rectifier Power Switch Q1.

The Module Mimic LED's will indicate input supply a.c. present ( 2 - steady green ) and after approximately 20 seconds the Inverter output healthy ( 4 - steady green ) and Battery unavailable (3) will light and also red led (13) will illuminate. The Display screen will show the following: Initializing Window: after first connecting power to the UPS and closing the Q1 isolator, this message will appear on the LCD screen. It persists for about five seconds while the control firmware is loaded. It is followed by a screen showing various messages with the time and date on the bottom line.

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BYPASS SWITCH OPEN  
BATTERY C.B. OPEN  
OUTPUT SWITCH OPEN  
HH.MM.SS DD.MM.YY

**Note:** If input power is present but the display remains blank, then the Micro Controller is not working, please contact your dealer for advice.

**THE FOLLOWING ACTION WILL APPLY POWER TO THE LOAD EQUIPMENT -ENSURE THAT IT IS SAFE TO DO SO.**

3. Close the UPS output power switch Q4.

The Module Mimic LED's will change so that the Load on inverter ( 5 - steady green ) and Battery unavailable (3) will light and also red led (13) will illuminate.

**Note:** In **ECOMODE** the Load on inverter led (5) is off.

The display window will show:

BATTERY C.B. OPEN  
BYPASS SWITCH OPEN  
HH.MM.SS DD.MM.YY

4. Close the Bypass input power switch Q2.

Bypass input Led ( 1 – steady green ) will light, after 20 seconds the inverter synchronises with the mains bypass.

```
BATTERY C.B. OPEN
HH.MM.SS DD.MM.YY
```

5. Before closing the battery circuit breaker check the d.c. bus-bar voltage. From the above window press the ENTER key:

The Main Menu Window will display:

```
> MEASUREMENT <
  FUNCTION
  MAINTENANCE
  SETUP
```

Select MEASUREMENT and press ENTER key:

```
OUTPUT
INPUT
> BATTERY <
  TEMPERATURE
```

Select BATTERY and the d.c. bus bar voltage will be displayed:

```
BATTERY
VOLTAGE 446 [V]
CURRENT 001 [A]
CHARGE 000 [%]
```

If the voltage indicated is satisfactory (432V d.c. for 380V a.c. system 446V d.c. for 400V a.c. system and 459V d.c for a 415V a.c. system) press the escape key repeatedly until the display returns to the original window.

6. Manually close the battery circuit breaker.

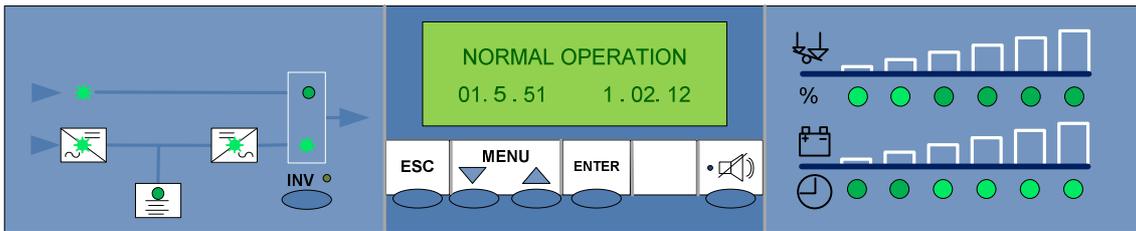
The Module Mimic indicator ( 3 ) Battery unavailable should extinguish. Several LED's on the Battery state of charge bargraph (17) will illuminate showing the battery state of charge. When the battery circuit breaker has been closed and the inverter has stabilized the screen will change to the default window.

The message shown below will be seen on the default screen whenever the UPS is operating normally:

```
NORMAL OPERATION
01. 5. 51    1. 02. 12
```

The top lines display the UPS operational status and indicates alarm conditions when they occur; and line four normally shows the time and date.

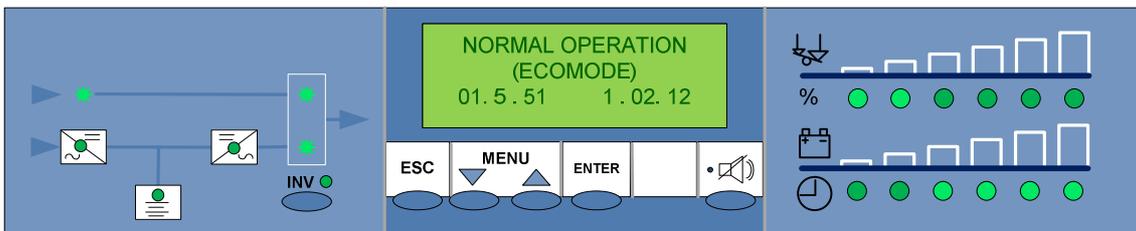
**The UPS is operating normally with its inverter supplying the load.**



**ECOMODE:** The following message will appear in the default screen whenever the UPS is operating in **ECOMODE**. The load is supplied by the Bypass Mains.



**The UPS is operating in ECOMODE with the Bypass Mains supplying the load.**



### 5. Procedure for Switching the UPS into a Maintenance Bypass condition from normal operation.

The first part of this procedure details how to select the Inverter OFF and power the load from the bypass mains via the Static Switch. This procedure should be followed to transfer the load from the UPS inverter output to the maintenance bypass system. This may be required during UPS maintenance procedures.

**NORMAL OPERATION:** follow the procedure below to transfer the load from the inverter output to the Maintenance Bypass of the UPS.

**ECOMODE:** follow the procedure below to transfer the load from the output to the Maintenance Bypass of the UPS.

**The following window allows the operator to select the UPS inverter ON or OFF .Before making this operation, read messages on display to be sure that bypass supply is regular and the inverter is synchronous with it, not to risk a short interruption in powering the load.**

**IF YOU ARE NOT SURE OF WHAT YOU ARE DOING - THEN DO NOT DO IT.**

1. Press the INV switch on the left side of the operator control panel.
2. Confirm this operation as instructed at the display:  
Press Enter for 1 second to confirm INV OFF  
Press Esc for 1 second to exit

WARNING! STOP  
INVERTER REQUESTED  
ENTER TO CONTINUE ↵  
ESC TO CANCEL

3. If Enter is pressed:

The Module Mimic indicator Load on Inverter ( 5 )will extinguish and the Load on Bypass indicator ( 6 ) will flash amber, and also the red led (13) will flash and normally will accompanied by an audible alarm. Pressing the Alarm Silence Switch cancels the audible alarm but leaves the warning message displayed until the appropriate condition is rectified.

#### **NORMAL OPERATION:**

4.a The UPS inverter will now shut down and the load will transfer to the Static Bypass supply. The Module Mimic indicator Load on Bypass (6) will flash amber and the Load on Inverter (5) indicator will extinguish.

**Your load is now powered via the Static Bypass system.**

#### **ECOMODE:**

4.b At this point the UPS inverter stops but the load continues to be supplied by the bypass mains. The Load on Mains indicator light (6) on the unit's synoptic panel flashes yellow, and the Load on Inverter indicator light (5) goes off.

**Your load is now powered via the Static Bypass system.**

5. Unfasten the lock, release the internal safety bar and close the maintenance bypass power switch Q3. Open the Output power switch Q4, Rectifier input power switch Q1, the bypass power switch Q2 and the Battery circuit breaker. The unit will power down but the load will continue to be supplied by the manual Maintenance bypass.

**WARNING: Wait 5 minutes for the internal d.c. bus bar capacitors to discharge.**

**The following points will be live within the UPS:**

- Bypass a.c. input supply terminals and busbars
- Maintenance Bypass power switch
- Static Bypass power Switch
- UPS output terminals and busbars

**Input and output terminals remain protected by a metallic cover**

**Your load is now powered from the maintenance bypass system and the UPS is completely shutdown.**

The load equipment is not protected from normal supply aberrations when operating in the maintenance bypass mode.

**6. Procedure for Switching the UPS ON from a Maintenance Power condition.**

Follow the procedure for 'UPS Start-Up: without interrupting power to the load'

**7. Procedure for completely powering down a UPS**

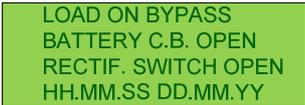
This procedure should be followed to completely power down the UPS and **LOAD**. All power switches, isolators and circuit breakers will be opened and there will be **no load power.**

**The following procedure will switch off all power to the load equipment.**

1. Open the battery circuit breaker and the Rectifier input power switch Q1.

The Module Mimic indicator Load on Inverter ( 5 ) will extinguish and the Load on Bypass indicator ( 6 ) will flash amber. The battery not available indicator ( 3 ) will light amber and the battery bar graph LED's will all extinguish.

The display window will show messages reflecting the actions taken ( i.e. Load on Bypass: Battery Breaker open: Rect. switch open: etc. ).



LOAD ON BYPASS  
BATTERY C.B. OPEN  
RECTIF. SWITCH OPEN  
HH.MM.SS DD.MM.YY

**Note:** In **ECOMODE** the message 'LOAD ON BYPASS' will not appear.

2. Open the Output power switch Q4 and the bypass power switch Q2. All operator LED indications and messages will extinguish as the mains driven internal power supplies decay.

3. To completely isolate the UPS from the a.c. supplies, the main external power input isolator (both isolators, where separate supplies are provided for rectifier and bypass ) should be opened.

On the primary input distribution panel, which is often located distant from the UPS area, a label should be posted advising service personnel that the UPS circuit is under maintenance.

**WARNING: Wait 5 minutes for the internal d.c. bus bar capacitors to discharge.**

**The UPS is now completely powered down.**

**The Maintenance Bypass Power switch may be operated at any time when the UPS is powered down to connect the load to the maintenance bypass supply if required. The load equipment is not protected from normal supply aberrations when operating in the maintenance bypass mode.**

**8. RESET procedure following shutdown of automatic switching or emergency stop (EPO action).**

Once all appropriate measures have been taken to correct the problem indicated by the alarm message appearing on the operator control panel display, carry out this procedure to restore the UPS to regular operation following an Emergency Stop or a shutdown of automatic switching.

Automatic switching may be shut down for the following reasons: the Emergency Stop button is pressed, Inverter Over temperature, Cut-off Overload, Battery Over voltage, excessive inverter to bypass switching (BYP: XFER COUNT BLOCK), etc.

```
EMERGENCY STOP
LOAD ON YPASS
INV: UNSYNCHRONIZED
HH.MM.SS DD.MM.YY
```

Press the ENTER key

**Note:** In **ECOMODE** the message 'LOAD ON BYPASS' will not appear.

Select FUNCTION and press ENTER key

```
> MEASUREMENT <
FUNCTION
MAINTENANCE
SETUP
```

When the PASSWORD has been completed press the ENTER key.

```
↑ WRITE      SAVE ↵
↓ MOVE      EXIT ESC
ENTER PASSWORD
00000000
```

Select NEXT PAGE and press ENTER key

```
BATTERY TEST
GENERATOR
PANEL SETUP
> NEXT PAGE <
```

Press the ENTER key

```
PROTOCOLS
ON/OFF UPS CONTROL
RELOAD UPS DATA
> RESET BUFFERS <
```

Select RESET ALARMS and press ENTER key

```
RESET ALARM HISTORY
RESET EVENT HISTORY
> RESET ALARMS <
```

Return the Display window to normal by repeatedly pressing the ESCAPE key back through the various windows until the default screen is displayed.

These operations resets the logic circuitry to enable the rectifier, inverter and static switch to operate normally.

**Note:** When the remote EPO switch has been activated it is necessary to manually close the battery circuit breaker. To prevent possible damage this must only be closed once the unit is supplying the load from the inverter.

**WARNING**

**When the EPO system incorporates a trip facility of the external a.c. input power supply circuit breaker, the RESET switch would have no affect on it. First close the external a.c. input supply circuit breaker, the UPS can be started in the normal manner, as the logic circuits will automatically reset on return of the power supplies.**

**9. Procedure to completely switch ON\OFF the UPS at the ups display control panel.**

1. From the Default window press the ENTER key: the Main Menu Window will display:

```
> MEASUREMENT <
  FUNCTION
  MAINTENANCE
  SETUP
```

2. Select FUNCTION and press ENTER key:

```
↑ WRITE      SAVE  ↵
↓ MOVE      EXIT ESC
ENTER PASSWORD
00000000
```

Before being allowed into the FUNCTION windows you are requested to enter a password. This is achieved by pressing the UP arrow key repeatedly until the first digit displays the character required, you then press the DOWN arrow key once to move on to the second digit. This action is repeated for all eight digits. When the PASSWORD has been completed press the ENTER key.

**Caution**

**This operation gives the operator access to modify UPS's operating mode, it is advised that only trained qualified personnel should attempt to do that.**

3. You now have access to all function windows.

Press the DOWN arrow key until the cursors have selected NEXT PAGE - press the ENTER key.

```
BATTERY TEST
GENERATOR
PANEL SETUP
> NEXT PAGE <
```

4. Press the DOWN arrow key until the cursors have selected ON/OFF UPS CONTROL.

Press the ENTER key.

```
MODEM CONNECTION
> ON/OFF UPS CONTROL <
RELOAD UPS DATA
RESET BUFFERS
```

**Caution**

**The following window allows the operator to select the UPS inverter ON or OFF, select the rectifier ON or OFF, select the rectifier to manual or float voltage and to switch OFF the Line (bypass) voltage to the load**

**IF YOU ARE NOT SURE OF WHAT YOU ARE DOING - THEN DO NOT DO IT.**

**NORMAL OPERATION:**

5.a Ensure INVERTER is selected by the cursors and press the ENTER key: The OFF selection will be highlighted, using the UP arrow key, rotate between the selections offered ( in this case it will be ON or OFF ) select ON. Press the ENTER key to execute your order. After approximately 20 seconds the Module Mimic LED's will change so that the Load on inverter ( 5 ) will light steady green and the Load on bypass ( 6 ) will extinguish.

6.a Return the Display window to normal by repeatedly pressing the ESCAPE key back through the various windows until the default screen is displayed.

**The UPS is operating normally with its inverter supplying the load.**

**ECOMODE:**

5.b Ensure BYPASS is selected by the cursors and press the ENTER key: The OFF selection will be highlighted, using the UP arrow key, rotate between the selections offered ( in this case it will be ON or OFF ) select ON. Press the ENTER key to execute your order.

The Module Mimic LED's will change: Load on Mains (6) will come on and Load on inverter (5) will go out.

6.b Return the Display window to normal by repeatedly pressing the ESCAPE key back through the various windows until the default screen is displayed.

**The UPS is operating in ECOMODE with the Bypass Mains supplying the load.**

**10. Procedure to switch ON\OFF the inverter at ups display control panel.**

This operation gives the operator access to modify UPS's operating mode, it is advised that only trained qualified personnel should attempt to do that.

The Display window will show the present status of the UPS:

1. Press the INV switch on the left side of the operator control panel.

2. Confirm this operation as instructed at the display:

Press Enter for 1 second to confirm INV OFF

Press Esc for 1 second to exit

3. If Enter is pressed:

The Module Mimic indicator Load on Inverter ( 5 ) will extinguish and the Load on Bypass indicator ( 6 ) will flash amber, and also the red led (13) will light and normally will be accompanied by an audible alarm. Pressing the Alarm Silence Switch cancels the audible alarm but leaves the warning message displayed until the appropriate condition is rectified.

**Note:** In ECOMODE the message 'LOAD ON BYPASS' will not appear.

4. Press the INV switch on the operator control panel to start-up the INVERTER.

**NORMAL OPERATION:** after 20 seconds the Module Mimic LED's will change so that the Load on inverter ( 5 ) will light steady green and the Load on bypass ( 6 ) will extinguish. Return to the normal window.

**ECOMODE:** the Load on Mains led (6) stays on while the Load on inverter led (5) will illuminate.

**ECOMODE:** The following message will appear in the default screen whenever the UPS is operating in **ECOMODE**. The load is supplied by the Bypass Mains.

### **11. Changing the current Date and Time**

- 1) From DEFAULT WINDOW, pressing ENTER key, select MAINTENANCE»ENTER»PASSWORD»ENTER» select and enter the line showing the time and date.
- 2) Position the cursor on the row on which the date-time is displayed, and press ENTER.
- 3) Using the 'UP' and 'DOWN' menu buttons, enter the current time and date information.
- 4) Press ENTER to save the settings, then press ESC twice to return to the DEFAULT WINDOW.

### **12 Alarm History**

The ALARM HISTORY window displays detailed current and historical events, warnings and alarms. This window allows you to quickly spot trends or diagnose problems that the unit may have had. The main menu is selected from the Default Window by pressing the ENTER key: Select MEASUREMENT/ALARM HISTORY and press ENTER key. Select ALARM HISTORY and press ENTER key. A request for the numerical alarms will appear. The last 99 events are stored in a non-volatile memory and can be viewed in the below window. Press the UP arrow key repeatedly until the first digit displays the character required, you then press the DOWN arrow key once to move on to the second digit. Press ENTER to confirm. Please wait This screen shows the history of active UPS alarms, in the order in which they occurred. Increasing number, alarm code, date and time identify the sequence of the events. The list of the events is continually updated, applying the technique known as FIFO (First In First Out); thus the oldest message is eliminated when the most recent message is added to the list. The asterisk represents the time in which the event starts. A line with the same alarm code indicates the end of the event. Press ESC key back through the various windows until the default screen is displayed.

<p><b>Do not reset the buffer memory until the fault signal shown has been examined and remedied by qualified technical service personnel.</b></p>
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