GTEC UPS MODEL:

LIBRA PRO

Technical Information - Alarm list

SERVICE MANUAL

Subject : **Trouble shooting on UPS "Libra PRO".**
Edit.: SCMA**,** Approv.: M. Scarpone, Date: 20/07/06
Variations: first edition

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Introduction

The ups of type "Libra PRO" perform controls automatically for help to locate the cause of possible malfunctions.
The result of this analysis has presented directly on the panel by means of a code of anomaly.
Additionally, the ups shows on the panel, the "internal memorized codes" relative to the state of corresponding operation to the in memorized anomaly.
Therefore in case of anomalies, it result also very useful take a note of the present internal codes, that can be visualized pressing the key 7.
The [ups] also shows on the panel or on the computer (by RS232 with the UCOM application), the history of the internal memorized codes and of the measures, complete of 120 events recorded in correspondence of each variation of the state of alarm (code a=….-….).
The correspondence between the internal status codes is also reported on the ups manual. The cases of anomaly are illustrated on the following paragraphs with the related number, with
a brief description of the causes and of the possible defective components.

Variation from previous troubleshooting information

IT2022A: First edition .

1:Not used.

2: Inverter permanent failure

The inverter was stopped after three attempts to start: look to code i=....-.. to get more information.
The failed components can be the following.

- Connections between cards (system (2032), inverter control (2076), IGBT driver), inverter IGBT, or inverter power circuits.
- Inverter IGBT or IGBT driver card, fail, (look to code i=....-.. to find IGBT number).
- Cards: system card(2032), Inverter control (2076), IGBT driver.
- Inverter output fuse.

3: Inverter output contactor failure

The inverter output contactor or the auxiliary contact, or the inverter output static switch (when present) did not close.
The failed components can be the following.

- Connections between the inverter output contactor or static switch, and the cards.
- Inverter contactor, power contact , auxiliary contact or contactor coil, inverter output static switch (when present).
- Aux. output contactor interface.

4: Rectifier Failure

The input rectifier was stopped because its output voltage was found too low after starting, or because an internal cable connection was missed, look to code r=....-.. to get more information.
The failed components can be the following.

- Connections between cards (system, rectifier control , SCR driver, SCR gates and katodes).
- Power SCR and relative cables.
- Cards: Rectifier control (2075), SCR driver .

5: Bypass SCR Failure ON or OFF

The bypass SCR failed to switch-on while on bypass operation
The failed components can be the following.

- Connections "K,G" on SCR.
- Cards : SCR driver.

Some current flew in the bypass SCR during inverter operation.
The failed components can be the following.

- Bypass SCR with a short circuit.
- Wrong bypass power connections.
- Cards: SCR driver, system card, output interface card.

6: not used.

7: Main power supply failure

The power supply voltage measured on the system card is not correct.
The failed components can be the following.
- Connections between power supply and system card.
- Cards: Power supply, system, inverter control, rectifier control , IGBT drivers, SCR drivers.

To identify the failed card can be useful to switch-on the ups with only the system card connected to the power supply. The others cards must be let not connected.
After seeing that the LCD panel works it is possible to connect again one card at time, in order to find the failed one.

8: Rectifier input current fail

One or more rectifier input current is much lower respect to the others or one of that is zero when the rectifier is operating.
The failed components can be the following.

- One scr input fuses or scr input.
- One gate-katode connection to input SCR not present or with wrong polarity or connected to the wrong SCR.
- Rectifier SCR driver or Control card.

9: Battery SCR failure

The feedback signal that confirm the battery SCR switching_ON is not received on system card.
Or it has been found a battery current >= 2% Ah of battery capacity.
Or it has been found a battery charging voltage when the battery SCR should be OFF

The failed components can be the following.

- Connections between cards: system, rectifier control, battery scr driver.
- Connections to battery SCR.
- Battery SCR or SCR driver card.

10: Fault on parallel signal circuits or any other fail >=10

If only the fail 10 is present, a parallel ups has be disconnected from the load because of a fault on parallel signal circuit.
The failed components can be the parallel interface card or the system card, the related connection or the ups link cable.
If also others fail >10 are present look for those cases.

11: Switching on inverter failure

The output voltage failed during switching load on inverter, look to c=…. code to understand on which output phase a wrong voltage was detected.
The cause of failure could be also the load that has some not normal peak of current.
The failed components can be the following.

- Connections between cards or cards: system, inverter control, power inverter, bypass interface.
- Inverter IGBT or IGBT driver.
- Inverter power output circuit.

12:Fail can-bus transmission from system card

There are errors on transmitted signal by CAN-BUS, from system to inverter control, rectifier control and aux. i/o cards.
The fail can be on the connection between cards or on one of those cards. It needs to check the system without one of those cards for each test.

13:Fail can-bus receiving from inverter control

There are errors on received signal by CAN-BUS, between system and inverter control card.
The fail can be on the connection between cards or mainly on inverter control card.

14: Fail can-bus receiving from rectifier control

There are errors on received signal by CAN-BUS, between system and rectifier control card.
The fail can be on the connection between cards or mainly on rectifier control card.

15, 16, 17: Error CAN-BUS receiving from auxiliary Input/output card

There are errors on received signal by CAN-BUS, between system and auxiliary Input/output card 1 or 2 or 3.
The fail can be on the connection between cards or mainly on one of auxiliary Input/output card.

18, 19, 20: Not used

21: Parallel slave ups unbalanced

A parallel slave ups has a load unbalancing over 20% respect to the master.
The cause can be on wrong ups output current measures.
The failed components can be the output current transformer or the related connections or components on inverter power card.

22: Parallel slave ups with different version

The ups system software version is different from that of other connected ups.
It needs to upgrade all ups connected in parallel, to the highest system software version.

23: Parallel slave ups with different number of output phases

An ups was connected in parallel with another having different number of output phases, For instance: a single-phase output ups with a three-phases ups.

24: Parallel master ups with transmission error

A parallel ups had errors while transmitting data to others in master operation.
The failed components can be the parallel interface card, the related connection or a ups link cable.

25: Ups previously started as parallel unit

The ups started as not parallel unit, but it ups was previously started as parallel unit.
The cause can be the parallel interface card or a wrong, or missed, connection between system card and the parallel interface card.
If the starting as single unit is correct because the using of that unit was changed, it possible to erase the message and the ups look inserting the customizing code 436215.

26: Failure to switch on bypass line

The switching from inverter to bypass line failed therefore the bypass line has been disabled after 1.5 sec.
The cause can be a weak bypass line that was not able to feed the load when the load feeding was switched from inverter to bypass line.
Another cause can be the bypass SCR or the SCR driver card or related connections.

27:Fail on reserve power supply from bypass line

The reserve power supply from bypass line did not feed the cards.
The failed components can be the following.

- Connections between cards (system, reserve power supply)
- Connections from input bypass line to reserve power supply card.
- Power supply card.

28:Fail or disabled one rectifier in single battery parallel systems.

One rectifier in a single battery parallel system result fault or disabled while in the same ups the inverter is operating and the other rectifier inside the other operating ups are operating. In this case also the inverter, in the ups with fail 28, will be disabled.
The failed components can be the those regarding the rectifier like fail4, or the SWIN has been left open.

29: not used.

30:Failure on temperature sensor.

One or more temperature sensors are open or not well connected. The cause can be one of the sensors on the power heatsink or one system or control /power card.

31:Failure on microprocessor reference oscillator.

The microprocessor reference oscillator does not operate correctly. It needs to change the system card.

37:High output voltage from inverter

The output voltage has been found higher then the set bypass voltage range, when operating from inverter.
The failed components can be the following.

- Connections between cards (system, inverter control, output interface card)
- Connections from output inverter to output interface card.

Translation of memorized internal codes.

For decode the internal microprocessor memorized code refer to the table "MEMORY CODES TABLE.

Memory Codes Table

[s =sistem, c=load, b=bypass, r= rectifier, i=inverter, a=alarm]

s= Systems codes

```
s=X... 1-3-5-7-9-B-D-F High system temperature
s=X... -23--67--AB--EF Multi Standard protocol active
s=X... ---4567----CDEF Remote "Ups off" input active
s=X... -------89ABCDEF Output frequency 60Hz

s=.X.. 1-3-5-7-9-B-D-F Power fail on system card
s=.X.. -23--67--AB--EF Master signals off
s=.X.. ---4567----CDEF System pll unlocked
s=.X.. -------89ABCDEF Output frequency out of range

s=..X. 1-3-5-7-9-B-D-F Low battery voltage
s=..X. -23--67--AB--EF Prealarm low battery voltage
s=..X. ---4567----CDEF Battery test active
s=..X. -------89ABCDEF Charger voltage out of range

s=...X 1-3-5-7-9-B-D-F --
s=...X -23--67--AB--EF Active DCD on RS232-1
s=...X ---4567----CDEF --
s=...X -------89ABCDEF Active DCD on RS232-2
```

c= Load codes

```
c=X... 1-3-5-7-9-B-D-F Current overload on output 2
c=X... -23--67--AB--EF Current overload on output 3
c=X... ---4567----CDEF Fan Failure
c=X... -------89ABCDEF High temperature on static switch

c=.X.. 1-3-5-7-9-B-D-F high peak current on output 1
c=.X.. -23--67--AB--EF high peak current on output 2
c=.X.. ---4567----CDEF high peak current on output 3
c=.X.. -------89ABCDEF Current overload on output  1

c=..X. 1-3-5-7-9-B-D-F Instantaneous Voltage error out 2
c=..X. -23--67--AB--EF Instantaneous Voltage error out 3
c=..X. ---4567----CDEF Average Voltage error on output 1
c=..X. -------89ABCDEF Average Voltage error on output 2

c=...X 1-3-5-7-9-B-D-F Output voltage in Stby_ON range
c=...X -23--67--AB--EF SWOUT output switch open
c=...X ---4567----CDEF Average Voltage error on output 3
c=...X -------89ABCDEF Istantaneous Voltage error out 1
```

b= bypass line codes

```
b=X... 1-3-5-7-9-B-D-F Bypass line 3 voltage fail
b=X... -23--67--AB--EF Bypass line 1 frequency fail
b=X... ---4567----CDEF Bypass line  voltage phases fail
b=X... -------89ABCDEF SWMB maintenace switch closed

b=.X.. 1-3-5-7-9-B-D-F Remote "Inverter off" input active
b=.X.. -23--67--AB--EF Current on bypass SCR
b=.X.. ---4567----CDEF Bypass line 1 voltage fail
b=.X.. -------89ABCDEF Bypass line 2 voltage fail

b=..X. 1-3-5-7-9-B-D-F Switching to bypass fail
b=..X. -23--67--AB--EF Bypass line disabled
b=..X. ---4567----CDEF Bypass SCR failed to Switch ON
b=..X. -------89ABCDEF Stby_OFF command active

b=...X 1-3-5-7-9-B-D-F Inverter output contactor fail
b=...X -23--67--AB--EF Inverter output contactor open
b=...X ---4567----CDEF Standby-ON command active
b=...X -------89ABCDEF --
```

r= input and rectifier codes

```
r=X...-.. 1-3-5-7-9-B-D-F Low voltage on input line 2
r=X...-.. -23--67--AB--EF Low voltage on input line 3
r=X...-.. ---4567----CDEF Low current on input line 1
r=X...-.. -------89ABCDEF Low current on input line 2

r=.X..-.. 1-3-5-7-9-B-D-F High voltage on input line 1
r=.X..-.. -23--67--AB--EF High voltage on input line 2
r=.X..-.. ---4567----CDEF High voltage on input line 3
r=.X..-.. -------89ABCDEF Low voltage on input line 1

r=..X.-.. 1-3-5-7-9-B-D-F Rectifier overtemperature
r=..X.-.. -23--67--AB--EF high voltage on rectifier output
r=..X.-.. ---4567----CDEF Rectifier card power fail
r=..X.-.. -------89ABCDEF Rectifier disabled

r=...X-.. 1-3-5-7-9-B-D-F Low current on input line 3
r=...X-.. -23--67--AB--EF Input current limiting active
r=...X-.. ---4567----CDEF --
r=...X-.. -------89ABCDEF Input line frequency error

r=....-X. 1-3-5-7-9-B-D-F Booster high negative output
r=....-X. -23--67--AB--EF Booster off for inverter fail
r=....-X. ---4567----CDEF High voltage on positive battery
r=....-X. -------89ABCDEF High voltage on negative battery

r=.....-X 1-3-5-7-9-B-D-F Rectifier cables link fail
r=.....-X -23--67--AB--EF Rectifier fail
r=.....-X ---4567----CDEF Parallel cable link fail
r=.....-X -------89ABCDEF Battery SCR open
```

i= inverter codes

```
i=X...-.. 1-3-5-7-9-B-D-F Inverter cables link fail
i=X...-.. -23--67--AB--EF Inverter card power fail
i=X...-.. ---4567----CDEF Inverter on STANDBY_ON status
i=X...-.. -------89ABCDEF Inverter open loop

i=.X..-.. 1-3-5-7-9-B-D-F --
i=.X..-.. -23--67--AB--EF IGBT module 1 or driver fail
i=.X..-.. ---4567----CDEF IGBT module 2 or driver fail
i=.X..-.. -------89ABCDEF --

i=..X.-.. 1-3-5-7-9-B-D-F  Inverter HIGH AC output voltage
i=..X.-.. -23--67--AB--EF  Inverter HIGH DC input voltage
i=..X.-.. ---4567----CDEF  Inverter overtemperature 1
i=..X.-.. -------89ABCDEF  Inverter overtemperature 2

i=...X-.. 1-3-5-7-9-B-D-F  Inverter disabled
i=...X-.. -23--67--AB--EF  Inverter syncro disabled
i=...X-.. ---4567----CDEF  Inverter Master
i=...X-.. -------89ABCDEF  High ups output volt. from inverter

i=....-X. 1-3-5-7-9-B-D-F  Inverter LOW AC output voltage
i=....-X. -23--67--AB--EF  --
i=....-X. ---4567----CDEF  Inverter takes power from output
i=....-X. -------89ABCDEF  Inverter thermal cables fail

i=.....-X 1-3-5-7-9-B-D-F  Inverter overtemperature 3
i=.....-X -23--67--AB--EF  IGBT module 3 or driver fail
i=.....-X ---4567----CDEF  Inverter disbled by boost fail
i=.....-X -------89ABCDEF  Inverter disabled
```

a= alarm codes

```
a=X..-.... 1-3-5-7-9-B-D-F  Prealarm for low autonomy time
a=X..-.... -23--67--AB--EF  Output active power overload
a=X..-.... ---4567----CDEF  Battery discharged or fail
a=X..-.... -------89ABCDEF  Output current overload

a=.X..-... 1-3-5-7-9-B-D-F  syncro off for disturbances
a=.X..-... -23--67--AB--EF  SWMB maintenace switch closed
a=.X..-... ---4567----CDEF  Bypass line volt fail or
a=.X..-... -------89ABCDEF  Input line volt fail or

a=..X.-... 1-3-5-7-9-B-D-F  Fail3, Inverter contactor  fail
a=..X.-... -23--67--AB--EF  Fail4, Rectifier fail
a=..X.-... ---4567----CDEF  Fail5, Bypass SCR fail ON or OFF
```

```
a=..X.-.... -------89ABCDEF  Fail6, Aux. power supply fail

a=...X-.... 1-3-5-7-9-B-D-F  Load on bypass
a=...X-.... -23--67--AB--EF  Bypass for low output load
a=...X-.... ---4567----CDEF  Fail 1, not used
a=...X-.... -------89ABCDEF  Fail 2, Inverter permanent fail

a=....-X... 1-3-5-7-9-B-D-F  Load on bypass for overload
a=....-X... -23--67--AB--EF  Panel  bypass for command
a=....-X... ---4567----CDEF  Remote bypass command
a=....-X... -------89ABCDEF  not used

a=.....-X.. 1-3-5-7-9-B-D-F  Fail 7, Power supply fail   system
a=.....-X.. -23--67--AB--EF  Fail 8, Rectifier input curr. fail
a=.....-X.. ---4567----CDEF  Fail 9, Battery SCR fail
a=.....-X.. -------89ABCDEF  Fail 10, presence of fails >= 10

a=......-X. 1-3-5-7-9-B-D-F  Remote "Ups off" input active
a=......-X. -23--67--AB--EF  Memory changed
a=......-X. ---4567----CDEF  Fail 11, return on inverter fail
a=......-X. -------89ABCDEF  Ups switched OFF by internal Timer

a=.......X 1-3-5-7-9-B-D-F  Overtemperature or fan fail
a=.......X -23--67--AB--EF  Bypass line voltage phases fail
a=.......X ---4567----CDEF  SWOUT, SWMB Output switches open
a=.......X -------89ABCDEF  Ups switched off by keyboard
```

p= internal code for parallel operation

```
p=X...-.. 1-3-5-7-9-B-D-F Parallel signal receiving fail
p=X...-.. -23--67--AB--EF Parallel signal transmit. fail
p=X...-.. ---4567----CDEF Parallel master operation fail
p=X...-.. -------89ABCDEF Parallel UPS phase model error

p=.X..-.. 1-3-5-7-9-B-D-F Parallel local bypass request
p=.X..-.. -23--67--AB--EF Parallel global bypass request
p=.X..-.. ---4567----CDEF Parallel bus power supply fail
p=.X..-.. -------89ABCDEF Parallel request became master

p=..X.-.. 1-3-5-7-9-B-D-F Parallel sync line fail
p=..X.-.. -23--67--AB--EF Parallel redund line fail
p=..X.-.. ---4567----CDEF Parallel local ident ok
p=..X.-.. -------89ABCDEF Parallel sync. main ok

p=...X-.. 1-3-5-7-9-B-D-F Master unit
p=...X-.. -23--67--AB--EF Parallel bypass signal fail
p=...X-.. ---4567----CDEF Parallel cable link fail
p=...X-.. -------89ABCDEF Parallel data line fail

p=....-X. 01234567------- Parallel unit ident. number
p=.....-X -12345678------ Parallel number of unit on load
```

o= options codes (codici per opzioni)

```
o=X. 1-3-5-7-9-B-D-F  --Disable of syncro inverter and switching to bypass line
o=X. -23--67--AB--EF  Active the auto off for Timer off
o=X. ---4567----CDEF  Active the auto off for low output load
o=X. -------89ABCDEF  --

o=.X 1-3-5-7-9-B-D-F  Commands code masked on display
o=.X -23--67--AB--EF  Battery test disabled
o=.X ---4567----CDEF  Fast output voltage error Alarm delayed
o=.X -------89ABCDEF  Disable inverter off command for bypass SCR failure
```