GTEC UPS MODEL:

LIBRA PRO IGBT

Standard UPS customizing and Service code

SERVICE MANUAL

www.gtec-power.eu

Subject: Standard ups customizing and Service code on LibraPro UPS. Approv.: M. Scarpone, Data: 30/03/2023
Variation: See variation cod.

Access to ups panel

Access to standard customizing (436215)

Access to the standard customizing menus and to the date and time clock regulation. This code clears also the alarm “Fail 25” that occur when a units was changed back from configuration for parallel operation to configuration for single operation.

Access to advanced customizations with “SetMode” (151515)

Access to advanced customizations with "ModoSet" (151515) Some customizations are accessible only after setting the "SetMode".
To set the "SetMode" it is necessary to insert the code "151515" and then it is necessary to verify that the abbreviation "SET" appears flashing on the right in the lower line of the panel. Only after having activated the "SetMode" it is possible to use the codes for the customizations that require it.
Note the “SetMode” is deactivated automatically after 2 minutes if no buttons are pressed.

Reset of standard customizing (153146 + SetMode)

Reset of standard customized settings to default values.

Disabling all submenus from panel keys (111777).

111777: Disable sub menus and commands on UPS panel. When you press a button on ups panel it is requested the same code for rehabilitation. The panel shows “PW1.” in place of “Cod.”.

Disabling only commands from panel keys (111773).

111773: Disable only commands menu on UPS panel. When you press a button on ups panel it is requested the same code for rehabilitation. The panel shows “PW2.” in place of “Cod.”.

Disabling customizing codes from panel keys (734273).

734243: Disable all customizing codes from UPS panel. When you press a button on ups panel it is requested the same code for rehabilitation. The panel shows “PW3.” in place of “Cod.”.

Hiding of the number (47263) displayed to execute the UPS OFF command (436213)

It covers the number to be entered to execute the UPS OFF command, which is normally shown at the panel. When enable this single option, on the panel appears the symbol "o = 01."

List of customized value, changed from default (keys 74)

From normal menu with key 7 and 4, it is possible to have a list of the customized values that have been changed from the default setting.

Reset of system Lock by overload or some internal fault (137215)

Inserting the code, the system will try to restart. This code mast be used carefully, because the restarting of a system with a present fault, can generate another fault.

Single unit system

Stby-OFF (642137 + SWOUT=OFF)

"Stby-OFF" operation, with the inverter and the output normally off.
The inverter, normally off, turns on with a delay of 0.5 sec.
when the input voltage drops below the value set for the bypass line.
The standard value is -20% of the rated voltage and is adjustable in the range -25 / -5%.
This operation is activated with 2 "Main" "Bypass" modes

Mode 5 = "Main" activates the inverter by observing only the voltage at the rectifier input,
and the input of the bypass line is ignored and remains disconnected.

Mode 6 = "Bypass" activates the inverter by observing the voltage at the input of the bypass line
which in this case must be connected.
This mode is less useful, however it remains because it was the only one present in previous systems.

In normal operation with input voltage present, in modes 5/6, the abbreviation "Stby_OFF" is shown on the top right panel and the abbreviation "CF" is added on the bottom left for mode "5" and only "F". in the "6" mode

To activate the Stby_OFF function you must first open the SWOUT output switch and then enter the code 642137, therefore you get the following menu.

```
Standby-OFF: Enabl.=0; Line Check=   ...
1,8=Esc.;  Line: 5=Main; 6=Bypass; 7=OFF
```

The function of the keys is as follows.
1.8: exits the menu.
5: set the "Main" mode
6: set the "Bypass" mode
7: Return to standard online UPS mode

Frequency converter 50-60Hz output, “C”, (156236 + Swout=Off).

Frequency converter with output fixed frequency of 50Hz or 60Hz. In this case, the bypass line is disabled.

```
Frequency converter Out: 50Hz=0, 60Hz=0
Adjust: (Open SWOUT)       5-6+,   7-8+
```

(Open SWOUT) remember to open SWOUT to change the type of operation, between ups and converter.

Selecting the key 8, it is fixed the frequency output 60.0Hz After selecting, the frequency varies slowly and appears (Converter = 60.0Hz).
By selecting the key 7 the system returns to operate as ups, it appears the mark (Converter = OFF).
By using the keys 6 and 5 it is possible to fix the operation as converter with fixed 50Hz output.

NOTE: When setting the frequency of 50Hz on an UPS UL 480V 60Hz, the output voltage is automatically set to 400V and the power rating is downgraded to smaller size. Eg. from 250 to 200, 200 to 160, ... from 80 to 65kVA.

Voltage stabilizer without battery “S”,(156234, or selecting Ah<=1)

Voltage stabilizer without battery. The operation can be select by code or by selecting battery capacity <= 1Ah.
On the panel appears the letter "S" and the initials "NO-BAT."

UPS with nominal output frequency fixed to 60Hz (616263 + Swout=Off)

It is disabled the self-frequency selection. The UPS will have nominal output frequency of 60Hz even when the system starts with input voltage to 50Hz.

UPS with nominal output frequency fixed to 50Hz (626355 + Swout=Off)

It is disabled the self-frequency selection. The UPS will have nominal output frequency of 50Hz even when the system starts with input voltage to 60Hz. Not usable on ups built for nominal 60Hz.

Disable automatic ups system restarting(446212)

Disable the automatic system restarting when the main line returns, after a the shutdown due to a battery discharging.
When enable this single option on the panel appears the symbol "o = 80".

First starting delay, based on time or battery charge status (412736)

Inserts a delay on the first load feeding, after a system shutdown due to a battery discharging. The starting waits a fixed time, adjustable from 0 to 60 sec. Until 100min, or a selected level of battery charge status, range 0-99%Ah.

```
System Start: charge= 0Ah%, Delay=  0sec
Adjust:               5-6+,         7-8+
```

When active the system starting delay by a selected time of 30 sec., the ups panel a time countdown starting from 30 sec.:

```
        SYSTEM OFF          30 sec.
```

When active the system starting delay by a battery status of charge of 20%, the ups panel starts to feed the output load only after charging the battery above 20%Ah level.
While charging the ups panel shows:

```
        SYSTEM OFF        BATT< 20Ah%
```

Delay to return on main line from battery operation (412746)

```
Delay to take power from main line when return from battery operation, range 0-255sec.
```

```
Delay to return on mains:       255 sec.
```

Compensation of output voltage dropping due to cable (436321)

```
Compensation of output voltage dropping due to connection cables to the load, range 0-5%.
```

```
Output cable Voltage drop. compens.=1.0%
Adjust:                             7-8+
```

Reduce nom. output PF to 0.8 (732675 +SetMode)

Reduces the nominal power factor to 0.8.
On the types of UPS "Navi" n. 2, 11, 16, 21, 19, 23, 26 from pf = 1 to Pf = 0.8
On the other types of ups from pf = 0.9 to 0.8 excluding MHE.
In the types indicated, the code "732675" directly sets pf = 0.8.
UPS nominal output power factor = 0.8

```
UPS nominal output power factor = 0.8
Adjust:                           7-8+
```

In this case, if key 8 is pressed, the pf value increases,
but then to return to the value 0.8, in the UPS "Navi",
you need to exit the menu, and re-enter the code 732675,
because for those types of ups the button 7 does not work.

Alarm for load over a set level (446123)

It changes the power level of the load to activate the remote alarm 79.
With the upgrade, the alarm 79 remains at 80%, then it can be changed from 10% to 110%.

```
Set alarm for load over level:  80%VA/W
Adjust:                           7-8+
```

Limiting time on battery operation (754217 +SetMode)

This option to turn off automatically the ups in battery operation, after a power failure with a delay equal to 2 times the value set as pre-alarm.

```
UPS-OFF after mains fail with preal.*2 =0
```

```
Adjust:     5-6+=Preal= 5min;       7-8+
```

The function is activated with key 8 and the pre-alarm time is modified with the 5/6 keys.
After shut down, the UPS automatically restarts when the main line come back,
The automatic restarting can be disabled with cod.446212 "System Autorestarting Disabled"

Reducing time of inverter short circuit without bypass(532145)

It reduces the time of delivery of the current inverter in case of output short-circuit with the absence of the bypass. The standard value of 1 sec.

```
Set short circuit time :         1.0sec.
Adjust:    4=0.4; 6=1sec.;          7-8+
```

Key “4” sets 0.4, the 6 sets 1, 7/8 sets with step 0.1sec.

Parallel systems

Parallel units with a Single battery (467123)

Selection of ups parallel units to operate with dc input from only a single battery. On the panel, the letter "P" parallel, becomes "B" when it is active the single battery operation.
NOTE: when operating with a single battery it is only available the standard battery charging, the cyclic charging is disabled.
From the rev.118, in the case of special ups of type = 1, the writing "2-3 + = Rect.paral = 0;" is shown
This allows the "parallel rectifier" function to be activated with button 3.
When this function is activated, the battery cyclic charge is also made available.

```
Parallel units with a single battery= 1
Adjust.:   2-3+=Rect.paral=0;       7-8+
```

Propagation of UPS_OFF command on parallel systems (421721)

Enabling propagation of command to shut down UPS from a single unit to other units connected in parallel.
Usually the command of UPS_OFF sent with the EPO input or on the panel or by RS232, causes the shutdown of the only unit that receives the command while the others continue normal operation.

Redundancy checking (461123)

Setting of the minimum number of units required to operate the parallel system, and/or enabling the checking of the availability of redundant units.

```
Set minimum parallel units required = 0
Adjust: (5-6+=Redund. Check:OFF),   7-8+
```

```
5-6+=Redund. Check:OFF = Disable/enable the redundancy checking
When the checking is enabled the panel actives the alarm message
```

```
Parallel Redund. lost: High unit power
```

The alarm is present on each unit for which the output power is above the level to maintain redundancy.
Example, in a system with two units active, the alarm is generated if the output power of each unit exceed 50%, in a system with three units if it exceeds 66%
in general if the power exceed : [100% * (n.unit active -1) / (n.unit active)]
`7-8+ = Minimum parallel units required =` Set the minimum number of parallel units that must be active for booting the system or for feeding the load during normal operation.

When the units are active below the number set it is activated the alarm:

```
Parallel Redund. lost:  Redund. unit OFF
```

"Energy Saving" with ups rotation, with/without redundacy (765432)

Setting to save power lost in parallel systems with or without redundancy.
If it is enabled with value 1, in parallel systems having more than 2 units, in case of low output load the system automatically reduces the number of active units, in order to reduce the power lost and always saving the redundancy.
All the units are always switched-ON when the load increases over the level to have redundancy, in case of overload and when the feeding line or the bypass line are not present.
Nota: from version 28 rev.157 the keys 5/6 select the operation with redundancy n+1, n+2, OFF.

When this function is activated with the value 1 (Redundancy=OFF), in the systems from 2 units, in case of low load output, it is automatically reduced the number of active units in order to reduce the power consumption without preserving redundancy.
All units are switched on anyway when overloaded and during power failure or bypass line not present.

ROTATION cycle of unit off:
To avoid that it is always the same unit turned off, every day is changed the unit that must be turned off first. For this, it is used the unit in the number of days of the month, so as to obtain a rotation cycle of 10 days.
The change occurs in the time set for the battery test. Every day all the units are switched on and then switched off gradually, starting from the one with the identification number equal to the day of the month.

NOTE: For testing, a full "Rotation" cycle can be activated every 10 minutes based on the value of the current minute units. The test mode is activated with the "3" key, then the message "Cycl.with min.ON 3 = OFF" appears as an alternative to "Redundacy = ON (6 => OFF)". The test mode is always deactivated with "3" and deactivated even when the current minutes are "59".

Menu with **value 1 Redundancy=n+1 :**
(to set Enable=1 it needs to use the key "8" and key "6" to set Reduntancy=n+1)**:**

```
Energy Save on parallel systems,Enable=1
Adjust.: (5-6+: Redundancy= n+1)     7-8+
```

When enabled, every 4 sec. one unit is switched-OFF if the output power in the active units result over the "Power_switch_OFF" value: Power_switch_OFF%= (90% * (n. ups-active - 2)) / n. ups-active

All the units are always switched-ON with in 1 sec. if the each single units result over the "Power_switch_ON" value.
Power_switch_ON%= (100% * (n. ups-active - 1)) / n. ups-active
The power levels to switch-OFF/switch-OFF are the following.

N. units ON	*Power to switch OFF*	*Power to switch ON*
8	67%	all units are ON
7	64%	85%
6	60%	83%
5	54%	80%
4	45%	75%
3	30%	66%
2	2 units are always ON	50%
1	2 units are always ON	2 units are always ON

The units that have been switched-OFF, show "**Energy Saving**" in place of "**OUT=…VA%**", on the panel.

Menu with **value 1 Redundancy=n+2 :**
(to set Enable=1 it needs to use the key "8" and key "6" to set Reduntancy=n+2)**:**

```
Energy Save on parallel systems,Enable=1
Adjust.:  (5-6+: Redundancy= n+2)     7-8+
```

When enabled, every 4 sec. one unit is switched-OFF if the output power in the active units result over the "Power_switch_OFF" value: Power_switch_OFF%= (90% * (n. ups-active - 3)) / n. ups-active

All the units are always switched-ON with in 1 sec. if the each single units result over the "Power_switch_ON" value.
Power_switch_ON%= (100% * (n. ups-active - 2)) / n. ups-active
The power levels to switch-OFF/switch-OFF are the following.

N. units ON	*Power to switch OFF*	*Power to switch ON*
8	56%	all units are already ON
7	51%	71%
6	45%	66%
5	36%	60%
4	22%	50%
3	3 units are always ON	33%
2	3 units are always ON	3 units are always ON
1	3 units are always ON	3 units are always ON

The units that have been switched-OFF, show "**Energy Saving**" in place of "**OUT=…VA%**", on the panel.

Menu with **value 1 Redundancy=OFF** :
(to set Enable=1 it needs to use the key "8" and key "5" to set Reduntancy=OFF)**:**

```
Energy Save on parallel systems,Enable=2
Adjust.:  (5-6+: Redundancy= n+1)     7-8+
```

When enabled, every 4 sec. one unit is switched-OFF if the output power in the active units result over the "Power_switch_OFF" value: Power_switch_OFF%= (80% * (n. ups-active - 1)) / n. ups-active

All the units are always switched-ON with in 1 sec. if the each single units result over the "Power_switch_ON" value =80%.

The power levels to switch-OFF/switch-OFF are the following.

N. units ON	*Power to switch OFF*	*Power to switch ON*
8	70%	all units are already ON
7	68%	80%
6	66%	80%
5	64%	80%
4	60%	80%
3	53%	80%
2	40%	80%
1	1 units always ON	80%

The units that have been switched-OFF, show "**Energy Saving**" in place of "**OUT=…VA**%", on the panel.

Bypass and synchronization

TOTAL disabling Bypass and synchronization (436555)

Disabling bypass line and the inverter synchronization to the frequency of the bypass line. When enable this single option on the panel appears the symbol "o = 10" on the upper row and the letter “C” in the lower row.

```
Bypass line & inverter synch. disable=1
adjustement:                        7-/8+
```

SINGLE disabiling bypass and/or sincroniz. (753211)

Independent disabling of bypass line and/or the inverter synchronization to the frequency of the bypass line.
When disabling the bypass line, in normal operation the panel shows “BY.Dis.”.
When disabling the inverter synch., in normal operation the panel shows “SY.Dis.”.

```
Inverter synch.= ON;    Bypass line = ON
adjustement:  5-/6+;               7-/8+
```

Delay to switch on bypass when not synchronized. (412716)

Set the delay for switching load from inverter to bypass line in the absence of the inverter synchronization.
Adjusting from 0 to 0.5 up to 5 cycles.
(Note on ups with inverter output contactor the system wait also the contactor opening)

```
Delay to switch on bypass:    0.5 cycles
Adjust: (active when not synch.),   7-8+
```

Max. frequency slew rate for inverter synchronization (423712)

Setting of the max. inverter frequency slew rate applied when synchronizing to bypass line frequency.
Adjusting range from 0.1 up to 2Hz/sec on not parallel units, and up to 1Hz/sec. on parallel units.

```
Inverter frequency slew rate: 1.0Hz/sec.
Adjustment:                        7=-,8=+
```

Disable the inverter shutdown/Bypass for “backfeed fault” (fault 5)(476312)

Disable the inverter shutdown, and bypass command on parallel systems, in case of back-feeding due to bypass line fault (Fault5).
To protect the bypass line from back-feeding it is possible to program a remote contact in order to open an external switch. (See “Customizing standard Remote outputs and input”)

```
Inverter Off for Backfeed fail. Now= ON
Adjustment:                       7=-,8=+
```

When enable this single option on the panel appears the symbol "o = 08".

System starting from bypass line (447155)

Allow the system starting to feed the load from bypass line, without waiting the inverter starting.

Delay on output voltage alarm to hold load on inverter (436777)

Set a delay on inverter output voltage error to avoid switching on bypass due to load current peak or load distorting current. The number indicates the delay expressed as 1 / 36 of the cycle. The useful range of regulation is from 0 to 10.

```
       Vout alarm Delay  =     0
Adjustment:    (3=Comp.V=0)  7=-,8=+
```

When enable this single option on the panel appears the symbol "o = 04".
The “3” activates or deactivates in (3=Comp.V=1), a dynamic compensation of the output voltage in proportion to the output current, useful with electro medical loads having high peak power demand.
The value 1 is not usable on ups operating in parallel.
From ver.28 rev.145 enabled the value “2” with key 3 to increase the output control voltage gain in parallel system to be used only with electro medical loads having high peak power demand.

Fine phase adjusting when using UGS interface (621345)

When using the UGS interface to synchronize to an external synchronizing source it is possible to make a fine adjusting with the code 621345.
This menu is available only when installed the UGS interface and while the ups is synchronizing to the external source because its bypass line voltage is not present. The adjusting can be done by measuring the voltage between the ups output voltage on phase 1, and the voltage from the external source, and changing the value shown on the menu, to get the minimum measured voltage.

```
UGS synch. phase :                +  0
Adjustment:                      7=-,8=+
```

Enable priority sync. to external with card UGS2 (426622)

Set the use of the card (UGS2), to synchronize the output voltage of a UPS group with that of another UPS group or from an external source.
The UGS2 board receives the signals for synchronization, by means of an RJ45 type cable connected to a “UGS control BOX”.
With the board 2059 in revision “D”or later, it is also possible to activate an alarm in case of disconnection of the cable.

```
           Enable UPS synch. to UGS2 = 0
Adjustement:                        7=-,8=+
```

The values that can be set with the 7/8 keys are 0, 1, 2.

0 = synchronization with external source is active only in the absence of the bypass line voltage.

1 = synchronization with external source is priority and always active.
In that condition, the phase between the output voltage and the bypass input voltage is measured.

- When the output voltage is in phase with that of the bypass input,
in normal operation, the abbreviation "SY.BYOK" appears on the panel
and switching on the bypass line without interruptions is enabled.

- When the output voltage is NOT in phase with that of the bypass input,
in normal operation, the abbreviation "SY.EXT" appears on the panel
and switching to the bypass line without interruptions is inhibited.

2 = synchronization as "1" with the enable of the "UGS interface LINK FAIL" alarm
Value 2 can only be used with the UGS2 board 2059 in revision "D" or later.

Disable the switching OFF of bypass line from command EPO (471263+SET)

Disable the switching OFF of bypass line when received the remote EPO command
(“Emergency Power OFF”).

```
Disable bypass OFF from remote EPO: = 1
adjustement:                         7-/8+
```

Setting "disable = 1", when the remote EPO command is activated, the inverter and rectifier are switched off. In a single-unit system, the load is switched to bypass line.

In a parallel system, only the unit receiving the EPO command is switched off, while the other units continue to operate normally. Then to disable the output load in a single system, it is also necessary to turn off the line at the bypass input. In a parallel system, you must also send the EPO command to all units.

In parallel systems, you can activate and propagate the bypass command with the function:
"UPS_OFF propagation in parallel systems cod.421721".

Output signals and input command, Standard and optional

Customizing standard Remote output / input signals (132344)

Change the operation of the standard “Remote” output signals and input command.

```
Remote Setting: 2=Contacts (RL1,RL2,RL3)
1=Esc. (4=init) 3=Input command (IN1)
```

2= Select menu to set alarm to activate the relay RL1,RL2,RL3 on REMOTE.
3= Select menu to set the command to execute by form input “IN1” on REMOTE.
4= init = Initialize with standard signals (look to Tables of Alarm and Action ident.):
RL=1, A.=66,(Bypass/Fault), delay=0 sec., Normally ON (Energized)
RL=2, A.=67,(Battery discharging), delay=0 sec., Normally ON (Energized)
RL=3, A.=68,(End of batt. discharge), delay=0 sec., Normally ON (Energized)
IN, A.=11, (Inverter OFF command), delay=0 sec., Normally OFF(open connection)

Set alarm to activate the relay RL1,RL2,RL3 with contacts available on REMOTE connector.

```
Remote set: RL=1; A.=66; Del=  0;  N.On
1=Esc;          3;  4-5+;    6-7+;     8
```

3= Select Relay to program
4-/5+= Change the number of alarm to set.
6-/7+= Change the number of sec. to delay the relay action when the alarm occurs.
8= N.On = Relay energized on normal condition without alarm present.
N.Off = Relay NOT energized on normal condition without alarm present.

Set the command to execute by closing a contact on input “IN1” on REMOTE connector.

```
Remote input set: A.=66; Del=  0;  N.On
1=Esc; 2=init;     4-5+;    6-7+;     8
```

4-/5+= Change the number of the action to execute.
6-/7+= Change the number of sec. to delay the action to execute.
NOTE: For the input the function N.Off/N.On is not enabled for all, the actions will be executed only when connecting a jumper on IN1 input. The N.On is enabled only for actions 1..3 and 16.

Setting optional expansion card with 6 outputs and 2 inputs (132341)

Activation and setting of the optional expansion cards with 6 relay to give 6 outputs signals and 2 inputs to receive 2 commands.
In the first menu the keys 1,2,3 select the card to be programmed.

```
Program. I/O expansion card 1,2,3 = 1,2,3
Clear card 1,2,3= 4,5,6. 7=Init,  8=Exit
```

The keys 4,5,6 clear the existing program on cards 1, 2, 3.
The key 7 set the standard alarms on card 1 and clear cards 2 e 3.
Standard alarms on card1:
Relè: RL1 = A. 80; <Load on iverter >
Relè: RL2 = A. 81; <Load on Bypass >
Relè: RL3 = A. 4; <Prealarm low battery >
Relè: RL4 = A. 7; <Output overload >
Relè: RL5 = A. 24; <Over temperature >
Relè: RL6 = A. 1; <Maintenace switch closed "SWMB ON">

Input 1 = 1; <Disable battery charging>
Input 2 = 2; <Disable switching to bypass line and inverter synch.>

Menu to program card 1 ((look to Table of Alarm Ident. And of action ident.).

```
Card 1 =Off; RL=1; A.=99; Del=100;  N.Off
1=Esc;    2;    3;  4-5+;    6-7+;     8
```

2= Activate the card 1. (When activated, the system give Fail 15 if the card is not connected.
3= Select relay (RL 1,2,3,4,5,6) or input (IN 1,2) to be programmed.
4-/5+= Alarm/action number to set for the corresponding relay/input.
6-/7+= Number of sec. of delay to activate relay or execute action.
8= N.Off = Only for relay, it indicates that the relay is normally NOT energized and
it will be energized when the alarm will be present.
8= N.On = Only for relay it indicates that the relay is normally energized
and it will be switched OFF when the alarm will be present.
NOTE: For the input the function N.Off/N.On is not enabled for all, the actions will be executed only when connecting a jumper on IN1 or IN2 input. The N.On is enabled only for actions 1..3 and 16.

Changing of remote contacts operation to drive emergency lights groups (446712+set)

This to get the driving of emergency lights groups with 3 different delay from the failure of voltage measures at the input of bypass line.
The delay to switch the relays RL1, RL2, RL3 is 40, 160, 280msec.msec.

```
Enable Rl1..3 command for CSS:       0
Adjustement:                      7=-,8=+
```

Input Rectifier

Gradual current absorption on rectifier input (current Soft Starting) (412756) (Power Walk in Duration)

Rectifier starting with a gradual current absorption (soft starting) from input main line.
The time to reach the maximum current value up to 130% of ups nominal current can be select from default 0sec. to 125 sec.

```
Rectifier softstart to 110%A:     0 sec.
Adjustement:      (5/6=Dynam.=0)  7=-,8=+
```

The keys 5/6 activate / deactivate the gradual absorption function dynamically at each load increase as well as at the first start of the rectifier.
NOTE: - On MHT / MHE / SPS, the writing "(5/6 = Dynam. = 0)" is visible only
if is programmed (menu code 457667)"Input control for Gen. Set .: Enable = 2"
- On MPT / MPM the writing is visible only after pressing the key “6”.

Delay to “Switch-ON” the rectifier (412746) (Power Walk in Start delay)

Delay to switch on the rectifier when the main line come back to normal, during the battery discharging. Range from 0 to 125sec.

```
Delay to return on mains:         0 sec.
Adjustement:                     7=-,8=+
```

Limiting of the maximum rectifier input current (121212, 121217)

Reducing of the maximum rectifier input current. Range from 10% to 100% of standard.

```
Fixed Input current Limit level = 110%A
Adjustement: 3=Power=0; (+100%)  7=-,8=+
```

Button 3 activates the function to have an input current limitation that hold the input active power constant.
The current limiting reduction selected with code 121212 is permanent.
The current limiting reduction selected with code 121217 will be applied only when it is applied a command to a remote input and that remote input has been programmed with action n. 18.

On MHT/MHE, enable rectifier input feeding with reverse phases sequence (311331)

The rectifier into the ups HP/HIP type operates only with an input voltage phases sequence equal to the inverter output phases sequence.
The automatic operation with standard or reverse phases in the rectifier input, it is possible only setting the value “ON” by menu with code cod.311331.

```
Input reverse phase seq. operation:  Off
Adjustment:                         7=-,8=+
```

Changing input control regulation mode MHT/MHE (457667+SetMode)

Changing the setting is useful in case of input mains
or input motor generator having lower power than UPS.

```
Input control for Gen. Set.: Enable=2
Adjustement:                        7=-,8=+
```

Value 2 = “Vectorial mode”, (default setting)
Value 1 = “Current mode 1”
Value 0 = “Current mode 0”

NOTE: To change regulation mode it is necessary to reset the control logic.
To reset the logic it is necessary to switch completely OFF the ups.
Alternatively, it is possible to open only the SWOUT switch,
Or from ver.28 rev.145, to switch on bypass operation.
In this case the display will show “4=reset” and the key 4 can reset.

```
Input control for Gen. Set.: Enable=2
Adjustement:      4=reset;    7=-,8=+
```

NOTE: added the function for reduction of the regulation gain, to be used to avoid any oscillations
in case of taking power from a low power motor generator compared to the power of the UPS
The function is available from ver.28 rev.125 with DSP version PXM3001 rev.96 or higher,
in the menu “3=LowGain=0;” is shown for activation,(not shown if SWOUT=Open or bypass operation) .

```
Input control for Gen. Set.: Enable=2
Adjustement:   3=LowGain=0;   7=-,8=+
```

Change of sync speed at input voltage for MHT/MHE (147313+SetMode)

Cod. 147313 Change of sync speed at input voltage with DSP
This function is active only with DSP firmware versions from PXM3001 rev.77.

```
Input booster PLL:          type = 0
Adjustement:             5-,6+; 7=-,8=+
```

The value "0" is set as standard (500msec response).
From 1 to 7 the speed is increased with values (response 350,250,150,100,70,50,40 msec.)
From 8 to 9, values equal to 7 remain (40 msec response).
From 10 to 14 the speed decreases (response 500, 700, 1000, 1500, 2000 msec.)
From 15 to 19, values equal to 14 remain (2000 msec response).
From 20 to 255 the standard value is equal to "0" (response 500msec.).

Reactive current regulation on input with MHT / MHE (124455+SetMode)

Reactive input current adjustment, available only if "MODE 2" code 457667 is set and with DSP firmware from PXM3001-rev.50.

```
Input Rectifier Reactive curr.  = +  0%A
Adjusting:                          7-/8+
```

By setting positive values, capacitive current absorption is obtained
Negative values result in inductive current absorption

Enable power recovery from output load to input mains (172123+SetMode)

The Cod. 172123 shows the menu to enable the power recovery from output load to mains.

```
Recover load power to mains:   Enable=0
Adjustement:                    7=-,8=+
```

The standard MHT/MHE ups are already able to recover to mains about 10% of nominal power.
Activating the enable the ups will be able to recover power up to nominal value.
This feature requires the DSP firmware from PXM3001 rev.77.
NOTE: in parallel systems, where the mains power is not at least double of total units power, you should not activate the recovery function because this can generate power oscillations at the input.
Battery
From PXP028rev.114 it is possible to select values 0, L, H.
The value 0 limits to 1%, L limits to 10%, H limits to 100%.

Increasing of internal Vdc-bus for MHT 400V and 480V UL (567567)

By setting the value 1 in the menu code 567567, the internal Vdc voltage is increased to improve the dynamic performance of the output voltage in the case of power supply for electromedical users or in case of load current with high harmonics. The panel shows:

```
Internal VDC_BUS:          Increase = 1
Adjustement:                    7=-,8=+
```

Battery

Disable battery charging from external contact (see input signals, 132341-132344)

This function can be get by connecting an external contact to the IN1 input of the optional expansion card (cod. 132341, or by customizing the standard REMOTE input (cod. 132344), setting the action n.1 to the input “IN1”. In this last case the standard input action to switch off the inverter will change to disable the battery charging.

Disable the automatic self battery testing(323232)

Disabling of the periodic automatic sel battery testing.
Inserting the code the display shows a menu to disable/enable the battery testing by keys 7/8.
Each time the enable is changed it i also reset the battery status of charge to 100%
When enable this single option on the panel appears the symbol "o = 02".

Disable the auto restarting of the battery testing(312126)

The panel shows

```
Battery test autorestarting Disable = 0
Adjustement:                        7=-,8=+
```

The value “1” disable the repetition of the automatic battery test that is executed within 1 minute after a failed test. This in order to have a permanent alarm also in case of battery partially not efficient and therefore to avoid to have only a transitory alarm.

Adjusting automating battery testing time (323234)

Changing of battery test interval e duration

```
Battery Test   : h= 8: 0, days= 1,  8sec
Adjustment:     2-/3+,   5-/6+,   7-/8+
```

-h=8:0 = hours of the day to start the autm. Battery test.
(Note this hours is the same used by timer Auto-ON)
-days=1 = Number of days between two autom. battery tests, range 1-99 days.
-8sec = test duration, range 8-120 sec.

Adjusting automating battery testing Voltage (types=1..3) (327654)

When selected the standard battery types 1..3, it can be set a voltage value offset that will be applied to the calculated e voltage value used by the automatic battery testing to activate the low battery charge alarm.

```
Battery type=1..3, 'Vs' Customiz.  + 0V
Adjustment:                        7=-,8=+.
```

'Vs' value is the "V Start discharging" to which it will be applied the customized offset voltage value. The same offset it will be applied also to the "Vp" (V prealarm) value.
This setting is useful to customize the voltage levels used by the automatic battery testing.
For instance, some "long life" batteries have lower discharging voltage than standard batteries. In those cases it could be useful apply an offset from – 10 to -30V.
This offset value is active only when selected the battery types 1..3.
When selected the battery type =0, the values "Vs" and "Vp" are directly adjustable from "prealarm" menu(keys 3,5,4,4).

"Manual" battery discharging (423531)

Executing of battery discharging with command from ups panel:

```
Manual battery test = OFF.     8= Start
BAT=+368V;     +0.0A; Vbc= 51V;   0min.
```

The battery discharging can be started and stopped by key 8.
To get the battery discharging the system decreases the rectifier charging voltage to the minimum voltage value. With this operation the battery be discharged without switching off the rectifier.

Changing the battery charging current (325511)

The battery charging current can be changed from the standard value = 10% of battery capacity.

```
Battery  100Ah,  charging 10 A, Standard
Adjustment:                      7=-,8=+
```

The adjusting range is from 3% up to 50% of battery capacity.
Note: the charging current is also limited by the total maximum current allowed by rectifier, therefore the charging current can result less than selected value because the ups is working with full output load. Look to the user manual to know the maximum available charging current as function of ups size and operation output load .

Single boost charging (323277)

Executing of e single boost charging.

```
Manual charge:( 1:30') 500V,10%Ah;   2 h
1=exit; 2=Start;  3-/4+V, 5-6+%Ah; 7-/8+
```

1:30'= Time to the end of the boost charging,
500V= set boost charging voltage, 3-4+= voltage adjusting.
10%Ah= charging current limited to 10% of battery capacity, 5-6+ = limit adjusting.
2 h = Duration of the boost charging, 7-8+ = duration adjusting.

Repetitive monthly boost charging (323276)

Setting of a repetitive monthly boost charging.

```
Charge H.: day= 1, ON/OFF=h12/13, V=500V
Adjustment:    4+, 5/6+          7=-,8=+
```

Day = number of the month day in which the boost charging will be executed.
4+= selecting of day number,
ON/OFF =h12/13, Starting charging at 12 hours, stopping hours=13,
5/6+= Selecting starting/stopping hours,
V=500V, boost charging set to 500V,
7-8+= adjusting of voltage.
Note: the charging current can be customized with code 325511.

Battery temperature alarm (327171)

The battery temperature alarm is active only when connected the external probe to measure the battery temperature. Inserting the code it can be changed the temperature value to start the alarm.

```
Battery temperature:  min=12, max= 50 Deg
Adjustment:          5-, 6+,      7=-,8=+
```

Disable battery using (156234 or selecting Ah <= 1)

The disabling of battery using (battery testing and charging) is the same function to use the ups as voltage stabilizer without battery. This function can be get by code or decreasing the battery capacity down to 1Ah..
When this function is selected, on the ups panel it is shown the letter "S" and also "NO-BAT.".

Recording one event each battery test (323237)

Enabling the recording of one event each time the system execute a battery testing.
When active this funtion, during the battery testing will be shown the symbol ">".

Boost charging time increasing (326666 bat.type=0)

Increasing of boost charging time, available only when selected battery type =0.

```
Boost charging time with 0%Ah:    00.0 h
Adjustment:                      7=-,8=+
```

Increases the time of boost charging by means of a time counter settable up to 50 hours with 0.2 hour steps.
The time counting start when the battery charging voltage reaches the max charging voltage (Vbat.Max).
When counting, the remaining time is shown eac. 2 sec. on the panel, in place of battery status of battery charge.
Note: the time counter is loaded in proportion of the residual battery charge during the discharging.
The total set time will be loaded only after a full battery discharging.
The time counter is set during battery discharging and also during battery test.
The time counter will be reset also when setting to 100%Ah the battery charge by means of code 323232.

Battery charging voltage Temperature coefficient (326665 bat.type=0)

Setting of battery charging voltage temperature coefficient.

```
Charge Volt. temper. comp.: -0.13%/Deg.K
Adjustment:                      7=-,8=+
```

This setting is available only when selected battery type =0 and it is installed the optional battery temperature probe.
The adjusting range is from -0.1% to -0.6%/Deg.K,. The value -0.13% is the standard value for battery types 1, 2,3.

Commands to force the value of battery charge from panel (3248, 3258, 3268)

It can be forced the value of battery charge to 0%Ah with the sequence 3248.
3.2 The keys start the battery test and then pressing 4 will reset the battery charge and then pressing 8 you exit test battery before its term.
With the sequence 3, 2, 4, 8, it sets the value at 0%Ah charge.
With the sequence 3, 2, 5, 8, it sets the value at 50%Ah charge.
With the sequence 3, 2, 6, 8, it sets the value of 100%Ah charge.

FlyWheel in place of battery(323331)

Set the ups to use a “FlyWheel” as Energy storing in place of a battery (to be used only on system with 40 12V battery blocks).

```
Fly Wheel in place of battery       = 0
Adjustement:                      7=-,8=+
```

Setting the value to “1” the ups will be set as follwing.

- The remote input “Inv_off” is set to receive the signal “FlyWheel OK” with a closing contact.
- When restarting after stopping, the ups will start from bypass line without waiting the “FlyWheel OK”
- When on bypass, the ups can switch back to inverter only if is present the “FlyWheel OK” signal.
- The received “FlyWheel OK” signal can be repeated on a remote contact by setting a relay with alarm n.93
- The remote contact “Bypass/Failure” is not activated s if it is NOT present the “FlyWheel OK” signal.
- On the ups panel, in place of “Bat.=100%Ah,”, it is shown “FlyWheel=0” or “FlyWheel=1” to indicate the signal status.
- The dc voltage from battery charge is fixed to 540V (2.25V/elem. with 40 battery blocks)
- The dc voltage from battery to switch off the inverter is fixed to 384V (1.6V/elem. with 40 battery blocks)
- The dc current limitation to feed and charge the FlyWheel, is set to half of ups nominal power value. (100kVA->50Adc)
- It is fixed battery type=0 with capacity 3 Ah.
- All automatic and manual battery tests are disabled.
- Disabled the remote action n.1 to disable the battery charging.

Monitor of aux,SWBAT_ext on MHT65-125 UL (345516 +SetMode)

- on MHT 65-125 UL, Enable the recognition of the state of the external battery breaker "SWBAT_ext", valid only if present the connection to the external battery breaker auxiliary.

```
Enable AUX_SWBAT on J4_3-6, card-2112: 0
Adjusting:                          7=-,8=+
```

Setting leves for low battery charge (321776 +SetMode)

Setting of 2 battery charge levels to start low charge alarm.

```
Bat. charge alarms: A.1= 0%Ah, A.2= 0%Ah
Adjusting:  3=OTHER     5-6+,      7=-,8=+
```

The value A.1 set level to start alarm n.82 when the battery charge is lower.
The value A.2 set level to start alarm n.83.
The level A.2 must be lower than A.1.
Note: these values are also used to activate/deactivate a GE with alarm/rele n.105.

With button 3, 2 other levels are set, A.3 and A.4 which generate alarms 116 and 117 respectively when the battery charge status is lower than the set values..

Setting battery voltage leves to activate GE (321777 +SetMode)

Setting of two levels of battery voltage to activate/deactivate the GE through the alarm / relay n. 105. It is activated with battery voltage lower than the minimum threshold "ON", and it is deactivated with a voltage higher than the max "OFF" value.

```
Vbat start/stop GE [V]   ON<376, OFF>396
    Adjustement:          5-6+,      7=-,8=+
```

Note: The alarm/rele n.105 is activated / deactivated also according to the charge values set with the code 321776.

Supercap in place of battery (512377)

Enabling to use a “Supercap” in place of battery

```
Operation with SUPERCAP battery     = 1
Adjustment:                      7=-,8=+
```

The battery is always kept connected (battery charger and battery SCR and always ON)
On MPT/MPM The rectifier output voltage increases slowly with about 10V / sec.
when the system is switched ON or when the main line returns.
The voltage increasing starts from the voltage level present when switching ON or when mains returns.
The battery type is fixed to zerod with a minimum of 1Ah.
The charging current is fixed to 20 * Ah.
The percentage of charge shown on ups panel while charging or discharging depends on battery voltage.
The percentage value shown, changes from 0 to 100% with battery voltage from min. to max.

Change levels of charging current limitation from remote command (324321)

Cod. 324321 activates a menu for changing the levels of limitation of the charging current that can be controlled remotely.

```
Charging current Limits:low=25%; mid=50%
1=Esc; (Charging=. . .A);    5-6+;    7-8+
```

Keys 5/6 = change the "low" level from the standard value of 25%, with 39 remote action.
Keys 7/8 = modify the "mid" level from the standard value of 50%, with 40 remote action.
"(Charging= . . .A)" indicates the active limit value.

Management of CST4 board for control of 3 battery strings (326113)

Cod. 324321 menu for the management of the "CST4" optional card to obtain the supplementary measures of 3 battery currents during the battery test.

```
Number of Battery Strings to be check= 3
Adjustment:       (3:Offset)     7=-,8=+
```

Keys 7/8= set the number of strings, max. = 3.
Key 3 = activation of the string current measurement calibration menu

```
Battery current - 0.0A n.=1; Offset:+  0
Adjust: (Select n.String:3/4/5/6)   7-8+
```

Keys 3 = deactivates the calibration of the measures relating to the strings.
Keys 4/5/6= activate the calibration of the offsets for the measurements relating to strings 1,2,3.

Checking Calibration and Testing

Activating the “SET” mode (151515)

Activation of the “SET” mode in order to enable the usage of the calibration and testing codes.
On the ups LCD panel, on the right, it will be shown the word ”SET” and also it appears counting down that closes the “SET” mode after 2 min. if is not touched any key.

Base calibration (151541 +SetMode)

Activate the base calibration procedure to be done on new system card to select the ups size.
This procedure require to open the SWOUT switch.
On the field, in case of installation of a new system card were it needs to select the ups size , it is possible to execute this procedure also holding closed the SWMB breaker in order to hold ON the output load.

Auxiliary calibration (123451 +SetMode)

Activates the auxiliary calibration. This procedure can executed without open the SWOUT switch and it does not change the normal status of operation. Therefore it can be executed also during the normal output load feeding.

Inverter current calibration for Debug mode (151124 +SetMode)

Calibration of the inverter current measured on transformer primary side (on IGBT output) and indicated by debug.

Debug UPS (251553 +SetMode)

Switch-OFF completely the UPS and activate the DEBUG mode.
From rev.106, after inserting the code, it will be asked to push the key “4” to execute.

```
1-8= EXIT;  DEBUG  ENABLE = 4
```

RS232 port Test (161514 +SetMode)

Menu for testing the two serial ports RS232, using the standard cable insert as loop connection into the two RS232 connectors.

Power circulation test (176455 +SetMode)

Menu to test the inverter by circulating power from inverter output to the input main line.

Test with adjustable rectifier output voltage (151571 +SetMode)

Menu to test the rectifier with adjustable output voltage. In this mode the battery is disconnected.

Clearing and initializing memory

Clearing ”Firmware not compatible” alarm message(253651 +SetMode)

Activate the menu to clear the ”Firmware not compatible” alarm message which is generated when it had been loaded a new firmware not compatible with the previous present on system card. Therefore all the memory will be cleared and the ups will restart on debug mode requiring also a new calibration.

Upgrading firmware on input control card with DSP (221314 + SetMode + SWOUT OFF)

This is required only on ups with input control card with DSP. It switch off completely the ups in order to upgrade that firmware.

Reset of the history event counter (345641 +SetMode)

Menu to reset or restore the history event counter

Reset of output energy counter (776611 +SetMode)

Menu to reset the counter of the outgoing energy.

Service Battery alarm (322231 +SetMode)

Display and set the number of months remaining to activate the alarm message “SERVICE BATTERY” when zero is reached. Up to 240 months can be set and automatic decrement cannot be disabled.

```
Months to service UPS:          50m  2d
Adjustment:                    7=-,8=+
```

Keys 7 and 8 allow you to change the number of months that will have to pass before triggering the alarm.
“50m 2d” : indicates that the alarm message will start after 50 months and 2 days from the present moment in which the menu is displayed.
Note: from ver.27 rev.36 when it is active the alarm, it is displayed also the telephone number that was set by the menu “MODEM dial n.=..” (keys 35744), accessible from the "standard customization" menus.

Service UPS alarm (152231 +SetMode)

Display and set the number of months remaining to activate the alarm message “SERVICE_UPS” when zero is reached. Up to 240 months can be set and automatic decrement cannot be disabled.

```
Months to service UPS:          50m  2d
Adjustment:                    7=-,8=+
```

Keys 7 and 8 allow you to change the number of months that will have to pass before triggering the alarm.
“50m 2d” : indicates that the alarm message will start after 50 months and 2 days from the present moment in which the menu is displayed.
Note: from ver.27 rev.36 when it is active the alarm, it is displayed also the telephone number that was set by the menu “MODEM dial n.=..” (keys 35744), accessible from the "standard customization" menus.

Custom serial number (154224 +SetMode)

To show a custom serial number using the modem-send field chars.
The cod. 154224 set the panel to show the serial number equal to the modem-send chars.
After inserting the code the modem-send chars can not be changed by ups panel.

Graphic panel BEFORE inserting cod.154224 and before changing “Modem-dial and send” fields.
…….
Serial N.= ..*Factory serial number*
Dial Tel.= 848 809191
Send Tel.= ..*Factory serial number*
…….

AFTER modify “Modem-send field chars”, and Modem-dial field chars
and inserting cod.154224
…….
Serial N.= ***Custom serial number***
Dial Tel.= *Custom dial number*
Send Tel.= **Custom *serial number***
…….
NOTE: the Modem-send field cannot be changed by panel keys, after inserting cod.

Test MODEM (726117)

Only in case of use of an external modem (no modem slot) connected to RS232-2 activates a call to an external

```
Test Modem on RS232:           active=0
Adjustement:                    7=-,8=+
```

Special custom version

Selection of special custom systems (151451 +Debug)

To be used only on special custom systems and it must NOT be used on standard UPS.
The usage of a type value not compatible with the system hardware can damage the unit.

```
UPS: STANDARD                  Type =   0
Adjustment:                      7=-,8=+
```

```
Type = 0  = "UPS standard          " = Standard ups
Type = 1  = "TLBACKFEED+ Al.aux1.3," = Ups with bypass contactor + alarms aux 1.3
Type = 2  = "UPS Ship, 690/230  30B" = Ups "Ship Italy", in/out 690/230V, 30 battery
Type = 3  = "Inverter 1/2 power,   " = Ups with inverter power = 1/2 bypass line power
Type = 4  = "UPS Cust. 480/480 60Hz" = Ups custom, with input/output 480/480V 60Hz
Type = 5  = "UPS Cust. 440/440 60Hz" = Ups cudstom with input/output 440/440V 60Hz.
Type = 6  = "MPT Conv. 400/440 60Hz" = Converter input/output 400/440V 60Hz (MPT)
Type = 7  = "UPS Telecom           " = UPS "Telecom Italy" type.
Type = 8  = "UPS UL 480V/480V 60Hz " = Ups type UL, with input/output 480/480V 60Hz
Type = 9  = "UPS Ship, 400V 30Batt." = Ups "Ship Italy", in/out 400/230V, 30 battery
Type = 10 = "Converter,690/690 30B." = Converter "Ship Italy", in/out 690/690V, 30 battery
Type = 11 = "UPS ship, 690/120 30B." = Ups "Ship Italy", in/out 690/120V, 30 battery
Type = 12 = "UPS HW12              " = Ups customized "HW.12"
Type = 13 = "UPS 480->400V50Hz  UL " = Converter UL, with input/output 480/400V 50Hz
Type = 14 = "UPS UL 400/400V 50Hz  " = Ups type UL, with input/output 400/400V 50Hz
Type = 15 = "UPS ENI (STBYON_HE)   " = Ups customized "ENI" with STBYON_HE operation
Type = 16 = "UPS Ship, 440V 30Batt." = Ups "Ship Italy", in/out 440/230V, 30 battery
Type = 17 = "Converter E.118-130Vln" = Converter, output 118-130Vln 400-60Hz.
Type = 18 = "Converter E.260Vln    " = Converter, output 260Vln 400Hz.
Type = 19 = "UPS ship, 600/120 30B." = Ups Ups "Ship Italy", in/out 600/230V, 30 battery
Type = 20 = "Converter 400/480V60Hz" = Converter voltage/frequency, 400/480V 60Hz.
Type = 21 = "UPS ship, 230/230 19B." = Ups "Ship Italy", in/out 230/230V, 19 battery
Type = 22 = "UPS In400V out230V3Ph." = Ups in.400V out.230V3ph. 32 battery
Type = 23 = "UPS Ship 440/115 1F30b" = Ups in.440V out.115V1ph. 30 battery.
Type = 24 = "MHx Conv. 400/440V60Hz" = Converter voltage/frequency, 400/440V 60Hz (MHT)
Type = 25 = "MHx Conv. 400/460V60Hz" = Converter voltage/frequency, 400/460V 60Hz (MHT)
Type = 26 = "UPS Ship, 690/230 40B." = Ups "Ship Italy", in/out= 690/230V3ph, 40 batt.
Type = 27 = "UPS 400in 440/440 60Hz" = Ups custom with input/output 400/440V 60Hz
Type = 28 = "UPS_28_400V400V60HZ34B" = Ups "Ship Italy" input/output= 400/400V3ph,60Hz 34 batt.
Type = 29 = "MHT CE 480V/480V 60Hz " = MHT CE special, input/output= 480/480V3ph,60Hz, CE, NOT UL
Type = 30 = "UPS MHT 440V/440V 50Hz" = Ups MHT special, input/output= 440/440V3ph,50Hz
Type = 31 = "MHT400 480V/480V 50Hz " = MHT400 special, input/output= 480/480V3ph,50Hz, CE, NON UL
Type = 32 = "Converter 690/400V50HZ" = FTP25 special, input/output= 690/400V3ph,50Hz
Type = 33 = "UPS Sh.690/400 60Hz30B" = FTP20 special, input/output= 690/400V3ph,60Hz 30 batt.
Type = 34 = "Conv. MHT 480/400 50Hz" = MHT/MHE special, input/output= 480/400V3ph,50Hz
```

Setting of units for systems with centralized bypass (363636 + Debug)

Cod. 363636, only in debug mode, activates a menu for setting a special units, inverter or static switch, to operate in a system with central bypass.

```
Central bypass sys. bypass=0, inverter=0
1=Esc,    unit set:     5-6+,       7-8+
```

Keys 5/6 = deactivation / activation of the operation as a static switchKeys
7/8 = deactivation / activation of the operation as inverter

Reduction of Nominal Power (273616+SetMode)

It reduces the UPS output power rating by up to -50%.

```
Red. UPS Nom.power In/Out: kVA=0000/0000
Adjusting:    3/4=In.+/-;         7-/8+
```

It reduces the nominal power available at the output
with the lower limit of 50% of the original power.
The power value shown on the panel and that transmitted via RS232 are also reduced.

NOTE: "3/4 = In. + / -;" avoids the reduction of input power and battery charger power when reducing the output power.
("3/4 = In. + / -;" is shown only when reducing the output power)

Variations cod. from PXP026. Rev.00

On PXP028.rev.161
- *Modification of type ups 29 from "MHT500.." to "MHT CE.." as applicable to several sizes.*
- *Added the paragraph " Access to advanced customizations with "ModoSet" (151515)*
- *The abbreviation (.. + set) has been replaced with (..+ModoSet) to indicate the need to set up the panel in "SetMode" with the code "151515" to be able to insert the customization codes that require it.*
- *Modification of the description of codes 322231 (SERVICE BATTERY) and 152231 (SERVICE UPS)*

On PXP028.rev.160
- *Added ups type n.33 for special 20kVA 690/400V 60Hz 30 battery.*
- *Added ups type n.34 for special MHT/MHE set as "Converter 480/400V 60Hz"*
-

On PXP028.rev.159
- *Added messages that can be activated for battery charge status below levels 3 and 4, which can be activated with code 321776.*

On PXP028.rev.158
- *Added code 326113 for managing the optional "CST4" board.*
- *Added actions 122 and 123 to command the optional card "CST4".*
- *Added action 124 to report string failure.*

On PXP028.rev.157
- *Nel cod.765432 added setting parallel operation with redundancy n+2.*

ON PXP028.rev.156

- *Added code 626355 to disable the self-learning of the frequency from the input, when the system start-up and maintain the nominal output frequency of 50Hz even when starting with 60Hz input voltage. Not usable on ups built for nominal 60Hz.*

- *The button "4 = En.Mesg." has been added setting "En.Mesg. = 1",*
  This to enable the display of the "Overload" message on the panel,
  which otherwise activates only the remote contact.

On PXP028.rev.155
- *Added remote alarm # 121 to indicate input current limitation applied by remote contact with action # 18*
- *Added ups type = 31, special MHT400, input / output = 480 / 480V3ph, 50Hz, CE, NON UL*
- *Added ups type = 32, special FTP25, input / output = 690 / 400V3ph, 50Hz*

On doc. PXP028.rev.154
- *For cod. 132344 132341.2.3, added the explanation that the delay value "Del." set for remote signals and commands corresponds to a number of intervals of 0.5sec. Therefore the applied physical delay time corresponds to the set value / 2. Eg by setting the value 30 you get a delay of 15 sec.*

- *Added menus:*
  Code 147313 change of synchronization speed for DSP
  Code 124455 Reactive current regulation on input with MHT / MHE

- *In the menu code 412756, added the adjustment for gradual dynamic absorption*

On PXP028.rev.154
- *Action n.45 has been added to switch off the output voltage. Inverter and bypass are switched off while the rectifier remains active.*

On PXP028.rev.153
- *Added Action n.44 to disable the STANBY_ON when the action is present with closed or open contact*

On PXP028.rev.152
- *Added relay alarms n.119 and 120 reserved.*

On PXP028.rev.146 ..151
- *summary updated, with no other changes.*

On PXP028.rev.145
- *In the menu cod.436777, "Delay on output voltage alarm" From ver.28 rev.145 enabled the value "2" with key 3 to increase the output control voltage gain in parallel system to be used only with electro medical loads having high peak power demand.*

- *In the menu cod.457667 "Changing input control regulation mode MHT/MHE" The key 4 can reset also on bypass operation without open SWOUT.*

Added ups On PXP028.rev.144
- *Added ups new type n.29 "UPS CE 480V/480V 60Hz " Only for customized special MHT*

- *Added ups type n.30 "UPS MHT 440V/440V 50Hz" Only for customized special MHT*

On PXP028.rev.143
- *The cod.567567 operates also on MHT/MHE 400V 50Hz*

ON PXP028.rev.142
- *Added new ups type n.28 = "UPS_28_400V400V60HZ34B" Only for special ups ship Italy input/output= 400/400V3ph,60Hz 34 batt.*

ON PXP028.rev 141 (no change on doc)
- *The resetting of action 11 (blocking the inverter), allows the restart of the inverter even in the event of a power failure with battery power only.*

On doc PXP028.rev.140 no change.

On PXP028.rev.139
- *in the menu code 426622, was added "later" to revision "D" of card 2059*

On PXP028.rev.139
- *Added action 43 from remote contact, to switch the system to bypass, keeping the inverter and rectifier on. This command is not stored and the system returns to the inverter when action 43 is terminated.*

- *Added alarm n.118: Energy manager: loss of communication with external power meter.*

- *In menu code 321776, 2 new levels of battery charge status control have been added: A.3 and A.4 With alarms 116 and 117.*

- *The description of the "UGS interface LINK FAIL" alarm has been entered in the menu code 426622, it can be activated with a value of 2 when the board in revision "D" is installed.*

On PXP028.rev.138 no change.

On doc. PXP028.rev.137
- *Added cod. 273616 to obtain a downgrading of the UPS*
  With the reduction of the rated output power up to 50% of the original one

On PXP028.rev.136
- Added Type = 27 = "UPS 400in 440/440 60Hz" = Ups custom with input/output 400/440V 60Hz

On PXP028.rev.133, 134, 135, no change

On PXP028.rev.132
- Added code 567567, to increase the internal Vdc to improve the dynamic performance of the output voltage in the case of power supply for electromedical users.
-

On PXP028.rev.131
- In the menu cod. 642137, "Stby_OFF" added the mode 5="Main"

On PXP028.rev.130
- In the menu cod. 732675, added the possibility of reducing the pf from 1.0 to 0.8 for UPS "Navi"

On PXP028.rev.129, no change

On PXP028.rev.128
- *Added the alarm n.114,* "Manual or monthly battery charging ON"

On PXP028.rev.127
- *In menu cod.(754217+SetMode)also added the setting of pre-alarm time with keys 5/6.*
- *Added the alarm n.113, "Insulation Loss A.C.2" available only on special UPS*

On PXP028.rev.126 no variation

On PXP028.rev.125
- *In menu cod.457667, added the function for reduction of the regulation gain, to be used to avoid any oscillations in case of taking power from a low power motor generator compared to the power of the UPS*
  The function is available only with DSP version PXM3001 rev.96 or higher.

- *The action n.26 from remote, Force the inverter synch. to ext. line with UGS2=0.*
  Disable the inverter synch. to ext. line with UGS2=2.
  It operates only on system with UGS interface.

On PXP028.rev.123 .. 124 no variation

On PXP028.rev.122
- *Addition of action n.42 to receive a signal from GE to stop return of energy feed to the GE in MHT/MHE*
- *Added code 321777 to set the voltage levels to activate/deactivate a GE*
  Through the alarm/relay n. 105. Note that the same alarm/relay is also activated/deactivated by the values of charge status set with code 321776.
- *Correct action 37 which first indicated the recharge block and instead activates the recharge*

On PXP028.rev.120 .. 121 no variation
On PXP028.rev.119
- *Action n.41 added from remote input, to activate the battery discharge on input mains*
  This can be used only on special MHT / MHE.

On PXP028.rev.118
- *In the menu cod.467123, for the activation of the single battery in parallel*
  added parallel rectifier management, only for special custom ups type = 1

On PXP028.rev.115..117 no change.

On PXP028 rev.114
- *in the cod.172123, (Ability to Power Recovery from Output load to input mains with MHT/MHE) It is possible to limit power down to 1%.*

On PXP028 rev.113
- *Added a function to check the shutdown cycle in "ENERGY SAVE" with the rotation of the UPS OFF by the value of the units of minutes in place of the units of the days. In the standard menu cod.765432, the "3" key activates the test mode with the minutes. The message "Cycl.with min.ON 3 = OFF" appears in the menu, pressing "3" again the writing disappears and the normal mode is reactivated with the days. The test mode is reset to zero every minute "59"*

- *Added additional conditions to generate "Alarm 88" for the purpose of controlling the opening of an external battery switch in case of faults. The alarm conditions are as follows*
  - Epo signal
  - Desaturation signal of an inverter module
  - Module temperature> 95 degrees
  - Continuous battery current> 5% f.s with inverter off
  - Internal Vdc voltage < min. battery voltage, with inverter off.

On PXP028 rev.112
- *Changed menu cod.765432 "Energy saving". To increment "Enable" to value "2" it needs to use the "6" key.*

On doc.v28r112
- *In table of remote programmable actions n.39 e n.40 Added "See the Cod. 324321 to change the ..% level "*

On PXP028.rev.106..111 no change.

On PXP028.rev.108
- *Added cod. 172123 (Ability to Power Recovery from Output load to input mains.*

On PXP028.rev.106, 107 no change.

On PXP028.rev.105
- *Added alarm n.112 to indicate load condition fed by inverter with battery charging above threshold 1 (set with code 321776).*

On PXP028.rev.104
- *Changed cod.251553 to enable/disable the Debug mode. The command will be activated after pushing the key "4"*

On PXP028.rev.103
- Change in function cod. 471263 for disabling line bypass by EPO command The bypass command propagation was disabled to all units in parallel systems in the case of an EPO command on a single unit.

On PXP028.rev.102,
- *Added the code 471263 to disable the switching OFF of bypass line from command EPO.*

On PXP028.rev.101, no change

On PXP028.rev.100
- *Added alarm n.111, that is activated in case of over temperature OR over load.*

On PXP028.rev.99,
- *Correction on types ups n.23 and 24, they change to n.24 e 25*
- *Added type ups n.26*
- *in cod.121212, New description with addition of the function to have an input current limitation that hold the input active power constant.*

On PXP028.rev.98, no change

On PXP028.rev.97.
- Changed the description of Supercap operation. Cod.512377. This because that operation was enabled also for MHT/MHE.

On PXP028 rev.96
Added cod.324321 Change levels of charging current limitation from remote command
- Added cod.363636 Setting of units for systems with centralized bypass.

On PXP028.rev.95
- When set the action 34 from remote, the battery charger will be always held ON.

- Published cod.457667. to change the MHT Input control regulation mode.
  Changing the setting was useful in case of input mains or input motor generator having lower power than UPS.

On PXP028.rev.94, no change

On PXP028 rev.93
- *Added ups type = 23, "Converter 400/440V60Hz",*
- *Added ups type = 24, "Converter 400/460V60Hz",*

On PXP028.rev.92, no change

On document PXP028.rev.91,
- Correct the description on "Menu with value 2 set (Redundancy=OFF):"
  The previous was wrong because it is only a copy of above text.

- Changed description on code 426622 that enable the ups synchronization by cards UGS2, whit priority to an external source.
  If enable is not set the ups synchronization has the priority to input bypass line.
  The ups follows the external source only if the bypass line is not present.

On document PXP028.rev.90
- Correction message shown with code 754217. *option to turn off automatically the ups in battery operation, after a power failure with a delay equal to the value set as prealarm.*

On PXP028.rev.86..90, no change

On PXP028 rev.85
- Change of FlyWheel setting, cod.(323331 +SetMode),
  1-The system boots from the bypass line even without the presence of the signal FlyWheel_OK
  2-Bypass / Fault not active when FlyWheel is not OK.
- The 57 Alarm (fault 37) is activated in error voltage output low or high.
- On the figures relating to remote relay contacts, it is specified that the figures illustrate the condition with relay off, not energized.

On PXP028.rev.84, no change

On PXP028 rev.83
- *Added alarm n. 108,* "Output frequency out of set range."

On PXP028.rev.81, 82 no change.

On PXP028 rev.80
- *added cod.532145 to reduce time of the inverter short circuit current.*
- *On cod.* 151451 *added ups type n.22 for special* "Ups in.400V out.230V3ph. 32 battery."

On PXP028 rev.79
- *On cod. 765432 added "Energy Saving without redundacy*

On PXP028 rev.78
- *added cod. 754217 option to turn off automatically the ups in battery operation, after a power failure with a delay equal to 2 times the value set as prealarm.*
- *added cod.512377 "Operation with SUPERCAP battery" only for MPT.*

On PXP028.rev.76, 77 no change.

On PXP028 rev.75
- *Added alarm n. 106 to command ON/OFF an input motor generator depending on Battery voltage with values Vprealarm/VchargeMax. The value "VchargeMax" Must be set with battery customizing menu selecting battery type=0. The same value is used also with battery type set =1..3.*
- *Added alarm n.107 to show "Insulation Loss A.C.+ D.C" when present one of the alarms n.85 or n.86.*
- *Added command n. 38 to switch OFF the ups when the command is active and to switch ON When the command is not active.*

On PXP028.rev.73, 74 no change.

On PXP028.rev.72
- *Added function with key "3" (3=Comp.V=0) on cod.43677.*
-

*On PXP028.*rev.68..71 no change.

On PXP028.rev.67
- *Added action n. 37, Available only for SPS: Start STBY_ON + Stop charging.*

On PXP028.rev.66
- *Added cod.446123 "Set alarm for load over level: 80%VA/W"*
- *Added cod.426622 "Enable UPS synch. to UGS2 = 1"*
- *Added 105 remote alarm that is activated according to the charge of the battery. It is activated if the charge is higher than level 1 (high) and it is deactivated when the charge is less than level 2 (low). The levels can be set with cod.321776..*

On doc. rev.65.
- *Insert alarm description n.10,15,23, from "not used".*
- *Changed alarm n.76 from "Command to drive ext. battery Contactor" to "Command to switch off an ext. battery switch"*
- *Changed alarm n.99 from "command to drive an external battery contactor" To command to CLOSE an external battery contactor"*

*On PXP028.*rev.65.
- *added action n.36: START MANUAL BATTERY CHARGING/ DISABLE BATTERY CHARGING. When active, it starts the "Manual" battery charging as set by code 323277. When not active, it disable the battery charging, limiting charging current to zero.*

*On PXP028.*rev.63..64 no change.
On PXP028.rev.62
- *Added action n.35. Enable/Disable the handling of common battery in parallel systems.*
- *Added special ups type, n.19, 20, 21.*

*On PXP028.*rev.61 no change.

On PXP028.rev.60
- *Activated alarms n.82 and 83 in case of battery charge under the levels fixed by menu cod. 321776.*
- *Added function to switch from STANDBY_OFF to ONLINE operation from an external Remote contact by means of action n.4*

*On PXP028.*rev.56 ..59: no change.

On PXP028.rev.55
- *Added alarm n.99, command to drive an external battery contactor.*

On PXP028.rev.54
- *Added ups type =20.*

On document Ver.28, rev.52..53: no change.

On PXP028.rev.50
- *Added ups type =19.*

On PXP028.rev.47
- Cod. 345516, enable the detection of the state of the external battery breaker "SWBAT_ext" on MHT 65-125.
- Code 726117, only in case of use of an external modem (no modem slot) connected to RS232-2 activates a call to an external.
- Added alarm.102 on remote Indicates PHASE OK between ups output and input bypass voltages.
- Added alarm.103 on remote, Pre-alarm over-temperature (4 degree lower Max.)
- Added alarm.104 on remote, Frequency error on input feeding main line.
- Added 2 new types ups 17 "Converter E.118-130Vln" en.18 "Converter E.260Vln"

On document rev.47:
- On cod. 156236, frequency converter, added a note for setting 50Hz operation on UPS UL 480V 60Hz.

On document rev.45: correct picture "Standard REMOTE signals" indicating RL3 in place of double RL2
And also showing the different symbol code on card printed circuit.

On PXP028.rev.45
- *Added the* ROTATION cycle of unit off in parallel system with active cod. 765432 "energy saving"
- *Added cod. 446712 for* Changing of remote contacts operation to drive emergency lights groups.

On PXP028.rev.43
- *Added remote action n.34, to stop the battery voltage increasing during constant Current charging and holding the reached battery voltage .*

On PXP028.rev.41..42 no change.
On PXP028.rev.40
- *Added cod.753211 for single disabling of bypass and/or inverter synch.*
- *Added remote action n.33, to disable bypass holding inverter synch.*
- Added ups type = 16 "UPS Ship, 440V 30Batt."
  (**Ups "Ship Italy", in/out 440/230V, 30 battery**)

On PXP028.rev.39 no change.
On PXP028.rev.38.
- *Added remote alarm signals 98..101.*

On PXP028.rev.33..37 no change.

On PXP028.rev.33
- Added "alarm ident" n.97 as addition of Alarms n. 11,13,14,71.
- Added commands 3248,3258,3268 to force battery charge from ups panel

On PXP028.rev.30
- **Changed remote action n.31 to disable the inverter synch. to bypass line and**
- **to external line with UGS. Holding the possibility to switch on bypass line,**
- **with short interruption,in case of inverter stopping because of fault**
- **or permanent overload.**
- Added code 441422 to enable "insulation loss AC" alarm in a custom ups equipped with signal input auto transformer to operate in systems without neutral wire in input and output.
- **Changed action n.9 from remote, to execute the bypass command also when the inverter is no sync. with bypass line, with short interruption.**
- **Changed description of action n.26**
  From "Disable synch. to bypass with UGS."
  to "Force the inverter synch. to ext. line with UGS.
  (the operation do not change, always the inverter do not sync. to bypass line and it is forced to sync. external line by means of to UGS)

Su PXP028.rev.29
- Changed action n.9 from remote, to execute the bypass command also when the inverter is no sync. with bypass line, with short interruption.

Su PXP028.rev.28
- Added action n.32 from remote to be used only on custom MHT.

Su PXP028.rev.26,27; no change.

On PXP028.rev.25
- Added possibility to set value = 96 = none alarm = relay disabled.

On doc. IT-COD..28rev24, Added standard setting on opt. remote card n.1, (cod.132341).

On PXP028.rev.24,
- Added action 31 to synchronize the inverter to external line connected with UGS, by means of a remote contact.
- Added new custom ups type selection from 10 to 15.

On PXP028.rev.19 …23, nessuna variazione.

ON document IT-COD..28rev16,
- Correction language on ups type list.

On PXP028.rev.16,
- Added cod. 154224 to show a custom serial number using the modem-send field.
- Added action 29 to execute UPS_OFF without sending command to switch off an external battery switch
- Added action 30 to reset a stored UPS_OFF command .

ON document IT-COD..28rev15,
- Added ups type = 8 e 9.

On PXP028.rev.15,
- Added ups type = 9.
- Added action 28 from remote input, to start one STBY_ON cycle when bypass line is OK. The started STBY_ON set is erased when the bypass line is not correct.

ON document IT-COD..28rev15,
- Added "Power walk in" on codes 412756 e 412746, title.

On PXP028.rev.13, nessuna variazione.
- Added action 27 to have a second EPO command from a remote "N.O." or "N.C." contact
- Activated alarm 63 also when the system is OFF because it is active the EPO signal.

ON PXP028.rev.12, no changes.

On document IT_COD..28
- added the information about the showing of the letter "C" in the panel lower row when it is insert the bypass disabling cod. 436555 or when it is active the remote action n.2 or 15.

ON PXP028.rev.11
- Added cod. 732675, to reduce nom. output PF from 0.9 to 0.8

ON PXP028.rev.01..08
- Added special ups Type = 8 = "UPS 480V/480V 60Hz, UL"
- Added cod. 734273 to disable all customizing codes.
- Added explanation on FlyWheel, cod 3233331, with remote action 24 and alarm 93.

On PXP027.rev.58,
- Added action n.26 from remote input to disable the inverter synchronizing to bypass line in system with UGS.

On PXP027.rev.53..57, no changes.
On PXP027.rev.52,
- Added alarm 92, to indicate rectifier operation status.

On PXP027.rev.51,
- Added action 25 and alarm 94.
-

On PXP027.rev.50, no change.

On document rev.49,
- Added cod. 151441+Debug, To be used only on special custom systems.
- Added action n.24, to receive "FlyWheel OK" signal.

On PXP027.rev.46 … 49, no change.

On PXP027.rev.45 ,
- changed cod. 111777 e 111773 , it is requested the same code for rehabilitation.
- new cod. 312126 disable the repetition of the automatic battery test.

On PXP027.rev.42 ,
- Added cod.111773 to disable only the command menu on ups panel (key 3)

On PXP027.rev.41
- Added remote signal n.91 to signal the condition of Bypass line enabled and output voltage present. This signal was used in a system with UGS control, to disable the bypass line on the slave group.

On PXP027.rev.40, no change.

On PXP027.rev.39
- Added new UPS type "UPS Telecom " (see cod. 151451)
- Added temperature settino level to give low battery temperature alarm (cod.327171).
- Added action 23, to receive a signal from an external input bypass line switch.
- Added alarm 89, to signal the opening of an external input bypass line switch.
- Added alarm 90, to signal low battery temperature.

On doc. 27rev37, On "self battery testing(323232)", correct symbol "o = 04" to symbol "o = 02".

On PXP027.rev.36
- Added cod. 327654 to customize the automatic battery testing Voltage (types 1..3)
- Changed description of alarm n.76: battery breaker command to battery Contactor command.
- Added the alarm n.88 to command the opening of an external battery breaker when the EPO is activated.
- When it is active the alarm "SERVICE UPS" or "SERVICE BATTERY" it is displayed also the telephone number that was set by the menu "MODEM dial n.=.." (keys 35744).

On PXP027.rev.34
- Added action from "Remote" n. 22, to disable the quick battery charging, to be used as second redundant command equal to that relative to action n. 13.

On PXP027.rev.31
- Added cod. 765432, "Energy Saving"
- Added actions from "Remote" n.19, 20, 21.
- Defined use of alarms remote n.82,85,86,95.

On document Ver.27.rev.30,
- Changed the explanation of the table of actions by remote inputs.
- On Disable the inverter shutdown… Fault5 … cod. 476312,
  added the explanation about the bypass command in parallel systems.

On PXP027.rev.29
- Added 121217, to reduce rectifier input current limitation only when present a remote command set with action n.18
- Added action n.18.

On PXP027.rev.27
Added cod.311331 valid only On HP/HIP ups, to enable rectifier input feeding with reverse phases sequence

On document ver.27 rev.19
Added the page with the electrical schematic of standard Remote signals.
Added the page with the electrical schematic of the optional signals expansion card.
Correction of the code "Repetitive monthly boost charging" from 323277 to 323276.
Correction of the code "Inverter current calibration for Debug mode" from 616543 to 151124.
On PXP027.rev.19
- added cod."151451" used to select special type of ups.
- added cod."717273" to select "Motor generator parallel enable" on special converter.

On PXP027.rev.16,
- added action 15 from remote.

On PXP027.rev.12, 13,
- added the explaining of code 621345 to get a fine adjusting with UGS interface
- added alarm " Fail 19" in case of fault of the SWOUT aux. contact

On PXP027.rev.11,
- Informed about code 137215 to reset system lock
  Note: this code was already present in all previous version.

On PXP027.rev.08,
- Not any new codes added.
- On new ups it is enabled the system starting from bypass line, when the bypass line is present ok, without waiting the inverter starting.
  With the code 447155 is always available the disable/enable customizing.

On PXP027.rev.07, enabled again the code 153146 to reset the standard customizing settings.
On PXP027.rev.03
- Added 121212 Rectifier input current limitation.
- Added 616543, calibration of inverter current reading for Debug mode
- Added 252525, 221314, code to handle ups having input card with DSP.

On PXP026
- Added 132344 Customizing standard Remote output / input signals
- Disabled 173431, 412326, because included into 132344, Customizing standard Remote.
- Added 461123 Redundancy checking.

Table of Alarm Ident. to set the relay operation (132344, 132341)

Alarm	Description of alarm to activate the relay	Alarm	Description of alarm to activate the relay
0	Disturbances on bypass line (inverter sync. Off)	**63**	System Off or EPO active
1	Manual bypass, SWMB on	**64**	***Normal operation***
2	Bypass line volt. Fail or SWBY, fscr Off	**65**	*General Fault*
3	Main line voltage fail or swin off	**66**	*Bypass/fault remote(RL1 Remote standard)*
4	Prealarm, low battery voltage	**67**	*Battery discharging(RL2 Remote standard)*
5	Low input voltage or output overload [w]	**68**	*Battery end of discharge (RL3 Remote standard)*
6	Low battery charge or close SWB	**69**	*Automatic Battery test active.*
7	Output overload	**70**	*Battery under charge, (Ah% < 99%).*
8	Temporary bypass, wait	**71**	*Battery charging Disabled*
9	Bypass for output power “VA” < auto-off value	**72**	*Bypass switching and inverter synchr. Disabled*
10	Fault 1 , precharge.	**73**	*External battery switch open*
11	Fault 2: Inverter	**74**	*Manual battery test active*
12	Fault 3: Inverter output contactor (TLI)	**75**	*Manual battery test OK*
13	Fault 4: Rectifier	**76**	*Command to switch off an ext. battery switch*
14	Fault 5: Bypass Scr	**77**	*Service UPS*
15	Fault 6 , input contactor.	**78**	*Service Battery*
16	Fault 7: Main Power supply cards	**79**	*Output load > 80%VA or > 80%W.*
17	Fault 8: One branch on rectifier	**80**	*Load on inverter with SWOUT closed*
18	Fault 9: Battery SCR or contactor	**81**	*Load on Bypass with SWOUT closed*
19	Fault 10: active together faults from n.11 to n.37	**82**	*battery charge under the level 1*
20	Bypass for output overload	**83**	*battery charge under the level 2*
21	Bypass command active; 8=com. off	**84**	*Alarm “Input switches OFF”*
22	Remote bypass command: active	**85**	*Alarm “Insulation Loss A.C.”*
23	Not used	**86**	*Alarm “Insulation Loss D.C.”*
24	Over temperature or fan failure	**87**	*Motor gen. parallel mode, (special version)*
25	Input voltage sequence not ok	**88**	*Command to open ext. battery breaker EPO*
26	Output off, close SWOUT or SWMB	**89**	*Alarm from action n.23, external SWBY opt.*
27	System off command active; 8=com. off	**90**	*Low battery temperature*
28	Remote system off command: active	**91**	*Bypass enabled and Output voltage present. (used in systems with UGS to disable slave bypass)*
29	Memory changed	**92**	*Input rectifier operating*
30	Fault 11: return on inverter failure	**93**	*Received signal “FlyWheel OK” UPS ready for BMS*
31	Timer off active	**94**	*“ Remote input signal active “*
32	Fault 12: Can Bus transmitting error	**95**	*” Overtemperature On Bypass line transf.”*
33	Fault 13: Can Bus inverter error	**96**	*Not used, or Clear BMS ALARM if set” bat Litio n.1”.*
34	Fault 14: Can Bus rectifier error	**97**	*Addition of Alarms ident n. 11 or 13 or 14 or 71.*
35	Fault 15: Can Bus expansion card 1 error	**98**	*Signal Inverter ON*
36	Fault 16: Can Bus expansion card 2 error	**99**	*Command to CLOSE an external battery contactor*
37	Fault 17: Can Bus expansion card 3 error	**100**	*Signal Inverter stopped by low battery*
38	Fault 18: not used.	**101**	*Signal ups operating stby-ON*
39	Fault 19: Error on SWOUT aux. contact	**102**	*PHASE OK between ups output and input bypass V*
40	Fault 20: not used.	**103**	*Pre-alarm over-temperature (4 degree lower Max.)*
41	Fault 21: error on parallel power balancing	**104**	*Frequency error on input feeding main line*
42	Fault 22: Slave Firmware not equal to master	**105**	Active with ah%> level1, not active with ah%< level2
43	Fault 23: Slave output phases num. not equal to master	**106**	Active Vbat > VchargeMax, NotAcive Vbat< Vpreal.
44	Fault 24: Error on parallel signals transmit. On master	**107**	Active= “Insulation Loss A.C.+D.C”(al.85+al.86.)
45	Fault 25: Ups previous started as parallel	**108**	Output frequency out of set range.
46	Fault 26: Switching to bypass error	**109**	Optional “Brake” circuit active.
47	Fault 27: Power supply card from bypass line, fault	**110**	Optional “Brake” circuit fail.
48	Fault 28:	**111**	Alarm Over Temperature OR Over Load
49	Fault 29: Error on rx signal from DSP card	**112**	Load fed by inverter and battery charged over level 1
50	Fault 30: One temperature sensor not connect.	**113**	Alarm “Insulation Loss A.C.” Only on special UPS
51	Fault 31: System card oscillator fail.	**114**	Alarm: manual or monthly battery charging ON
52	Fault 32: not used	**115**	Alarm UGS card LINK FAIL
53	Fault 33: not used.	**116**	battery charge under the level 3
54	Aux alarm active.	**117**	battery charge under the level 4
55	Fault 35: Redundacy lost in parallel system.	**118**	Loss of communication with external power meter
56	Fault 36: Slave ups locked by the rectifier off.	**119**	Reserved.
57	Fault 37: Low/High output voltage.	**120**	Reserved.
58	High battery temperature	**121**	Active the input current limitation by remote action n.18
59	Manual Battery test Failed	**122**	Command 1 for CST4 card.
60	Fan fault.	**123**	Command 2 for CST4 card.
61	Aux . Fuses failure	**124**	Battery string failure
62	Parallel signal cable link fail		

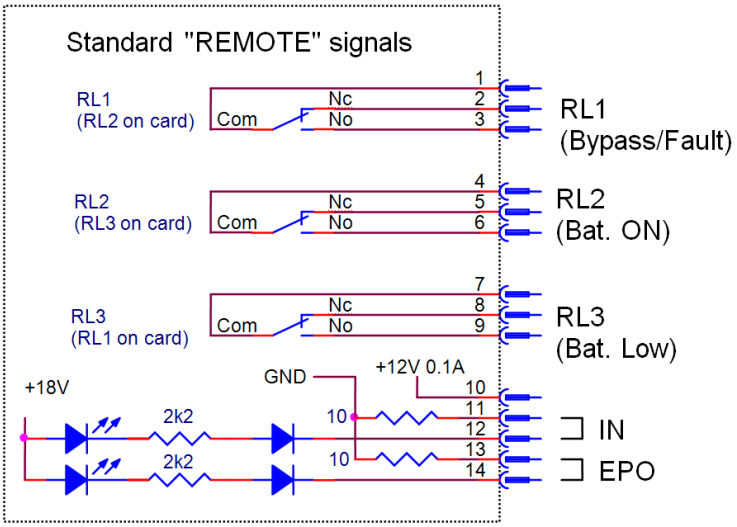
Table of action ident. to set action to be executed from input (132344, 132341)

Act..n	Action executed when the input contact is closed or opened. **Avoid to set the same action number on two inputs in the expansion cards.** **The setting of the same action on two inputs gives a WRONG operation.**		
1	**DISABLE BATTERY CHARGING.** Set to minimum the charging current, independently from load. The action operates by a PERMANENT closed contact.	24	**Receive "FlyWheel OK" signal.** The action operates by a Permanent closed contact.
2	**DISABLE BYPASS LINE and INVERTER SYNC.** The action operates by a PERMANENT closed contact. The upper row shows "BY.dis" in normal operation and the lower row always shows the letter "C".	25	**To receive an optional generic signal** When receiving an external signal it is activated the alarm " Remote input signal active ". The input contact can be normally open or closed.
3	**Receive AUX contact from external SWBAT.** Activates the battery fail alarm when it receive an open signal from an external battery switch. Th action operates by a PERMANENT aux contact that can be selected n.o or n.c.	26	**Force the inverter synch. to ext. line with UGS2=0.** **Disable the inverter synch. to ext. line with UGS2=2.** It operates only on system with UGS interface.
4	**SET THE STANDBY-ON OPERATION o**r reset the **STANDBY_OFF operation.** The action operates by a PERMANENT closed contact. When the input contact is open the ups come back to normal operation	27	**EPO command from REMOTE** It can operates from "N.O." or "N.C." contact.
5	**Start/Stop the AUTOMATIC BATTERY TEST.** The actions operates by the TRANSITION from open to closed contact.	28	**One STBY_ON cycle with bypass OK.** The started STBY_ON set is erased when the bypass line is not correct. It can operates from "N.O." or "N.C." contact.
6	**Start/Stop the MANUAL BATTERY TEST.** The actions operates by the TRANSITION from open to closed contact. It is the same action executed with cod. 423531. The rectifier output voltage will be reduced to force feeding from battery. In case of battery fail the inverter will not be off.	29	**UPS_OFF without sending command to an external battery switch.** It can operates from "N.O." or "N.C." contact.
7	**Start/Stop of an optional BATTERY discharging TEST.** The actions are executed by the transition open/closed contact.	30	**Reset of a stored UPS_OFF command.** It can operates from "N.O." or "N.C." contact.
8	**Start/Stop the MANUAL BATTERY CHARGING**. Execute the "Manual" battery charging that had been set by code 323277. The actions operates by the TRANSITION from open to closed contact.	31	**Command to disable inverter synch. From bypass line and from external line by UGS.** It can operates from "N.O." or "N.C." contact.
9	**Start Commands Bypass + Inverter Off.** This action operates with short interruption in case the inverter is not sync. with bypass line. The action operates by the TRANSITION from open to closed contact.	32	**Disable input stage PWM, only on custom ups.** It can operates from "N.O." or "N.C." contact.
10	**CLEAR THE BYPASS COMMAND.** The action operates by the TRANSITION from open to closed contact.	33	**Disable bypass line holding the inverter synch. to bypass line**
11	**INVERTER STOP.** The inverter is stopped and the ups switch to bypass line only if its voltage is present OK. The inverter will be off with a permanent closed contact. It restart when the remote contact will be open.	34	**Stop the battery voltage increasing during constant current charging and holding the reached battery voltage. (The battery charger will be always held ON)**
12	**RECTIFIER STOP**. The rectifier will be off with a permanent closed contact. It restart when the remote contact will be open.	35	**Enable/Disable the handling of common battery in parallel systems.**
13	**LOCK ON BATTERY FLOATING CHARGE**. It locks to battery floating charging. The quick and cyclic charging are disabled. The panel will show "BatF." In place of "Batt."	36	**START MANUAL BATTERY CHARGING/ DISABLE BATTERY CHARGING .** When active, it starts the "Manual" battery charging as set by code 323277. When not active, it disable the battery charging, limiting charging current to zero.
14	**LOCK ON BATTERY QUICK CHARGING.** The floating and cyclic charging are disabled. The panel will show "BatQ." In place of "Batt."	37	**Only for SPS: Start STBY_ON + Start charging.** Available with contact "N.O." or "N.C".
15	**Disable Battery Charging and Bypass line.** It executes actions 1 and 2 with one command. Useful in case of feeding from motor generator.	38	**Command UPS_OFF, without storing OFF.** Active=ups_OFF, NotActive =ups_ON.
16	**Show the alarm** **" Overtemperature On Bypass line transf."**	39	**Limits charging current to 25% of standard.** It can operates from "N.O." or "N.C." contact. See the Cod. 324321 to change the 25% level
17	**Enable the motor generator parallel mode.** This operation is available only on special converter unit.	40	**Limits charging current to 50% of standard.** It can operates from "N.O." or "N.C." contact. See the Cod. 324321 to change the 50% level
18	**Limits the input current .** The limit value must be set by cod. 121217. The action operates by a Permanent closed contact.	41	**Executes the battery discharging on input Mains** This can be used only with special MHT/MHE
19	**Show the alarm " Input switches OFF"** The action operates by a Permanent closed contact.	42	Receive a signal from GE to stop return of energy to GE in MHT/MHE
20	**Show the alarm "Insulation Loss A.C."** The action operates by a Permanent closed contact.	43	**BYPASS Command NOT stored** The inverter and rectifier remain on. Automatic return with OFF command
21	**Show the alarm "Insulation Loss D.C."** The action operates by a Permanent closed contact.	44	**Deactivates the STANBY_ON** when the action is present, with closed or open contact
22	**LOCK ON BATTERY FLOATING CHARGE**. Equal to action n.13. to be used as redundancy.	45	**Switch off the output voltage**. Swiching off the inverter and bypass. The rectifier remains active
23	**To receive external SWBY signal status.** It starts a panel alarm and the remote alarm n.89.		

Standard "REMOTE" signals

The figures illustrate the condition with relay off, not energized.

Pin	Function	Descr.	Standard function
1	Output RL 1 (pin1..3)	Common	Bypass Fault (1-3 open)
2		Normal Closed	
3		Normal Open	
4	Output RL 2 (pin4..6)	Common	Battery discharging (4-6 open)
5		Normal Closed	
6		Normal Open	
7	Output RL 3 (pin7..9)	Common	Battery LOW (7-9 open)
8		Normal Closed	
9		Normal Open	
10	Output	+12Vdc, 80mA max.	
11	Input	Return for input "IN"	Inverter OFF
12		Input "IN"	
13	Input	Return for input "EPO"	EPO
14		Input "EPO"	



Signals and input command optional expansion card

The figures illustrate the condition with relay off, not energized.

Pin n.	Function	Descr.
1	Output RL 6	Common
2		Normal Closed
3		Normal Open
4	Output RL 5	Common
5		Normal Closed
6		Normal Open
7	Output RL 4	Common
8		Normal Closed
9		Normal Open
10	Output RL 3	Common
11		Normal Closed
12		Normal Open
13	Output RL 2	Common
14		Normal Closed
15		Normal Open
16	Output RL 1	Common
17		Normal Closed
18		Normal Open
19	Input	0V common for inputs In1/In2
20	Input	+12Vdc, 80mA max.
21	Input	IN2 (Opto 2)
22	Input	IN1 (Opto 1)