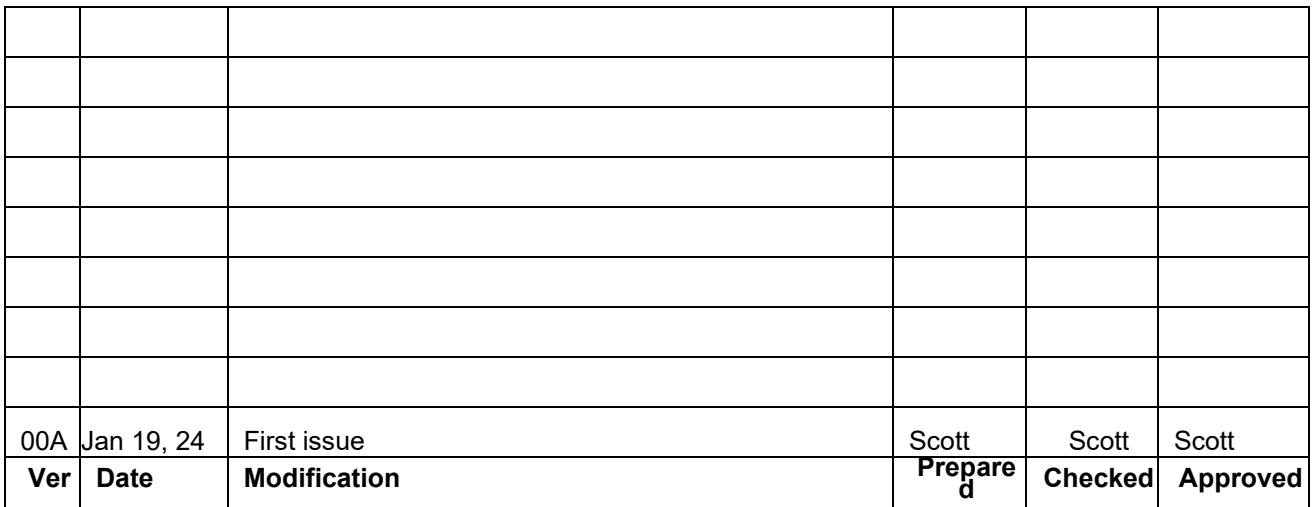


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1. General functions

UPS range

- ❑ 1000/1500VA, 120V (Low Voltage)

Topology

- ❑ On line double conversion, without galvanic insulation.
- ❑ Input power factor corrector (PFC).
- ❑ Automatic bypass, allow to transfer the load to the mains in case of overload or internal fault.

Charger features

- ❑ Charger works even if the UPS is in standby mode.
- ❑ Charger with APFC(Low ripple current).
- ❑ Charging current selection, 4A (Default).
- ❑ Charging current measurement.
- ❑ 2 stage charging management.
- ❑ OVP, OCP, OTP and short-circuit protection.
- ❑ Charger smart control by CPU.

Battery features

- ❑ Cold start : the unit can start on battery.
- ❑ Battery test: at each start-up and then, once every week.

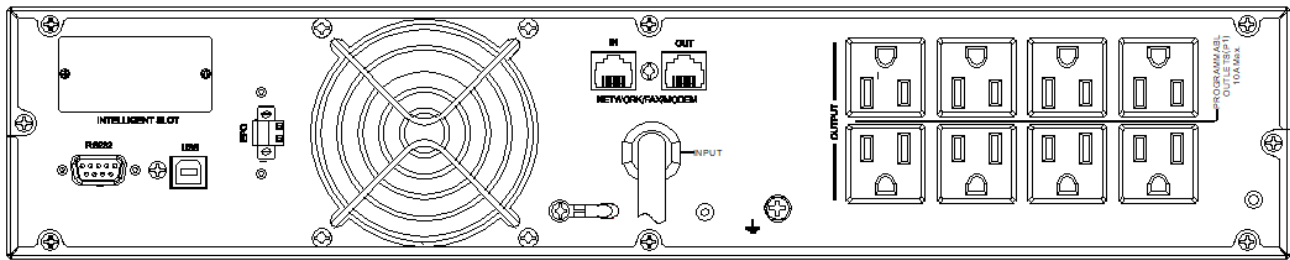
Additional features

- ❑ Nominal voltage: output voltage can be set through the UPS LCD panel (100/110/115/120/125/127V).
- ❑ Frequency synchronization: Within 50/60Hz ± 3 Hz by default, the output frequency is synchronized with input mains.
- ❑ Frequency converter: 50Hz to 60Hz converter mode.
- ❑ Automatic restart after short circuit: maximum 3 times and space 30s.
- ❑ Site Wiring Fault (SWF) : detection of line and neutral reverse and ground missing.
- ❑ Emergency Power Off (EPO) : EPO connector at rear panel allow to turn off the output voltage.
- ❑ Energy saving (ECO) : the ECO range can be set through the monitor software or the UPS LCD panel.
- ❑ Green function: when autonomy, the UPS will shut down automatically when equipment power consumption less than 5%.
- ❑ Programmable Outlet: when autonomy, the programmable outlet power supply time can be set through the monitor software or the UPS LCD panel.
- ❑ High Surge level immunity
- ❑ Smart fan speed control
- ❑ Slot operation simultaneous.
- ❑ High over load capacity
- ❑ Event logger(optional)

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Input/Output receptacles



1000/1500VA

Communication

- ❑ Slot: Voltronic/Megatec protocol for optional SNMP, AS400 and MODBUS card

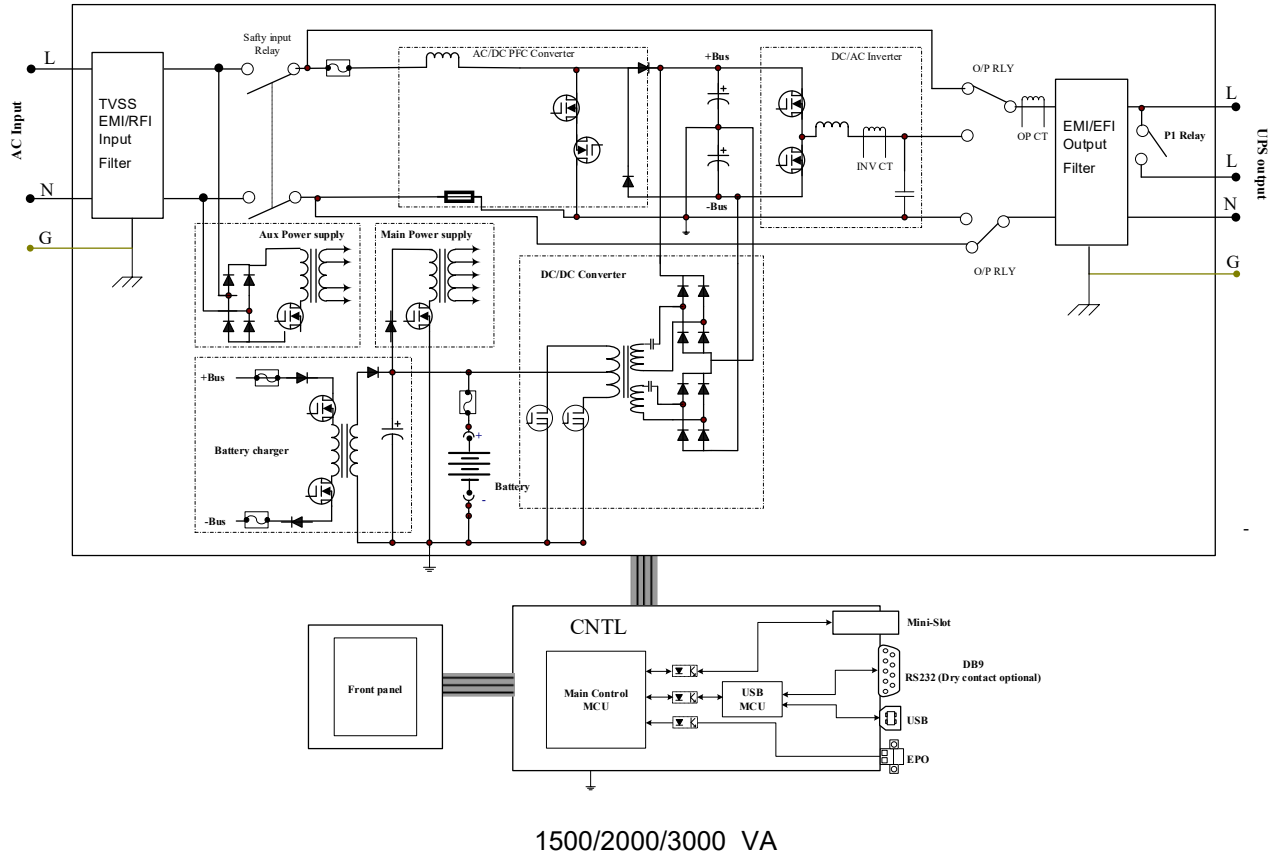
Mechanical features

- ❑ Versatile:
Rack/Tower 1000/1500VA (D x W x H: 302mm x 438mm x 86.2mm)
- ❑ Structure: Metallic with metallic front panel.
- ❑ Front panel: Metallic with paint
- ❑ Color: Black
- ❑ Earth screw: No

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2. Functional diagram



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3. Electrical features

High voltage models / (Low voltage models)

3.1 Output power rating

Item	Specification	Comments
3.11 VA / Watt / Power factor	1000VA / 900W / 0.9.....	N1C.LS1000
	1500VA / 1350W / 0.9.....	N1C.LS1500
3.12 Wave form	Sine wave	On line - double conversion

3.2 Input electrical features

Item	Specification	Comments
3.21 Cold start		
☐ Output voltage	(120V/60Hz)	As default values
☐ Startup condition	Battery Voltage > Low battery voltage	See chapter 3.44 part Low battery level
3.22 Input voltage in line mode		
☐ Nominal voltage	(120Vrms)	Single phase
☐ UPS starting threshold	Line low comeback ~ line high comeback	
☐ Line low detection	Ambient Temp. <= 40°C (80V) ± 3%..... (70V) ± 3%..... (60V) ± 3%..... (55V) ± 3%..... 40°C < Ambient Temp. <= 45°C (87V) ± 3%..... (77V) ± 3%..... (67V) ± 3%..... (62V) ± 3%..... Ambient Temp. > 45°C (92V) ± 3%..... (82V) ± 3%..... (72V) ± 3%..... (67V) ± 3%.....	At 100-80% of full load ± 5% At 80-70% of full load ± 5% At 70-60% of full load ± 5% At 0-60% of full load ± 5% At 100-80% of full load ± 5% At 80-70% of full load ± 5% At 70-60% of full load ± 5% At 0-60% of full load ± 5% At 100-80% of full load ± 5% At 80-70% of full load ± 5% At 70-60% of full load ± 5% At 0-60% of full load ± 5%
☐ Line low comeback	Ambient Temp. <= 40°C (87V) ± 3%..... (77V) ± 3%..... (67V) ± 3%..... (62V) ± 3%..... 40°C < Ambient Temp. <= 45°C (95V) ± 3%..... (85V) ± 3%..... (75V) ± 3%..... (70V) ± 3%..... Ambient Temp. > 45°C (100V) ± 3%..... (90V) ± 3%..... (80V) ± 3%..... (75V) ± 3%.....	At 100-80% of full load ± 5% At 80-70% of full load ± 5% At 70-60% of full load ± 5% At 0-60% of full load ± 5% At 100-80% of full load ± 5% At 80-70% of full load ± 5% At 70-60% of full load ± 5% At 0-60% of full load ± 5% At 100-80% of full load ± 5% At 80-70% of full load ± 5% At 70-60% of full load ± 5% At 0-60% of full load ± 5%
☐ Line high detection	(150V) ± 3%	From 134V to 150V, the PFC may not have 100% capability

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☐Line high comeback	(145V) $\pm$ 3%	
☐Input voltage distortion (THDU)	10% max	Same tolerances as above
3.23 Input voltage in bypass mode		
☐	Min / Max 85V - 140V $\pm$ 2%..... Line detection level setting 85V - 115V $\pm$ 2%..... 120V - 140V $\pm$ 2%.....	LV Default Line low setting Line high setting
3.24 Input voltage surge rating		
☐Nominal capacity	Low voltage models: 316J 13000A(L/N) 528J 13000A(L/G) 528J 13000A(N/G).....	EN61000-4-5 V:1.2us/50us I:8us/20us

Note 1: In bypass mode, (load powered through bypass), the bypass opens if the line level becomes outside the min/max threshold defined according to Line detection level setting by front panel or if bypass over current.

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3.25 Input power factor		
☐ Input power factor	≥ 0.99	Normal input @ full load condition
3.26 Input current in line mode		
☐ Nominal RMS current (battery full charged)	LV 9.3A..... 12.5A.....	((O/p VA* PF) / Nominal voltage)/(eff.) or Limited by Input power cord rating N1C.LS1000 N1C.LS1500
☐ Maximum RMS current (in normal mode, battery full charged)	LV (over load= 110%) 13.2A..... 13.2A.....	((O/p VA* PF) * 1.1 / Line low detection) / (eff.) or Limited by Input power cord rating N1C.LS1000 N1C.LS1500
☐ Inrush current	Max 6 times the full load peak input current, decaying exponentially within 30 ms.	The measurement will be taken at nominal input voltage and at phase angles of 90 and 270 degrees, for currents in excess of 1.5 ms duration
☐ THDI	<= 5%	@ (80~140Vac) THDU < 1.6% input and full linear load condition with including full battery charged and charger works; IEC 61000-3-2 / IEC 61000-3-3
☐ Input current protection	User input circuit breaker, electric protection and internal fuse	Electric protection based on the input power cord or socket capacity, the detail see Appendix A
3.27 Input current in bypass mode		
☐ Nominal RMS current	8.3A..... 12.5A.....	Output VA / Nominal voltage N1C.LS1000 N1C.LS1500
☐ Maximum RMS current	13.2A..... 13.2A.....	Output VA * 1.1 / Bypass low detection or Limited by Input power cord rating N1C.LS1000 N1C.LS1500
3.28 Input Frequency in line mode		
☐ Nominal frequency	50Hz (60Hz) auto detect	The nominal frequency is configured according to measured input frequency during the unit starting. If measured frequency is 55.1Hz - 65Hz, nominal frequency setting will be 60Hz If measured frequency is 45Hz - 55Hz, nominal frequency setting will be 50Hz
☐ UPS starting condition	Frequency low comeback ~ Frequency high comeback	Same for both high/low voltage models
☐ Frequency low/comeback	40/40.5Hz ± 0.2Hz	
☐ Frequency high/comeback	70/69.5Hz ± 0.2Hz	
3.29 Input Frequency in bypass mode		
☐ Frequency range to enable transfer to bypass	50Hz (60Hz) ± 2.5Hz (by default)	The output frequency is synchronized to the input line.
☐ Frequency range for operation on bypass	50Hz (60Hz) ± 3Hz (by default)	The output frequency is synchronized to the input line.

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3.3 Output electrical features

Item	Specification	Comments
3.31 Output voltage		
☐Nominal voltage	(120V)	As default value
☐de rating	(100V/110V/115V/120V/125V/127V)	10% de rating for 100V
☐Static regulation	Output voltage $\pm 1\%$	Any normal condition (no load, full load, full charged or discharged battery)
☐Dynamic accuracy	$\pm 6\%$ (Peak, 2Cycle) on line mode.....	During 0% to 100% R load take on and 100% to 0% R load take off
	$\pm 9\%$ (Peak, 2Cycle) on battery mode	During 0% to 100% R load take on and 100% to 0% R load take off
☐Peak voltage	< (190V)	Same condition as above Electronic protection $1.1 \times \sqrt{2} \times V_{out}$
☐Transient response	< 60ms	Up to recover static regulation after full RCD load take on/off
☐DC component	< 100mV	No load / Full load (EN50091-3)
3.32 Output frequency (see Appendix B for detail)		
☐On line mode (normal operation)	Same as input line between 50Hz (60Hz) $\pm 3\text{Hz}$ (by default)	The output frequency is synchronized to the input line.
☐On line mode (frequency converter operation)	50/60Hz (60/50Hz) $\pm 0.1\text{Hz}$	
☐Battery mode	50Hz (60Hz) $\pm 0.1\text{Hz}$	
☐Slew rate	< 1Hz / s	
☐Bypass mode	Same as input line (see section 3.29)	In frequency stand alone and converter mode, transfer to bypass is forbidden
3.33 Output distortion		
☐THDU	2% max.....	Full Linear load
	4% max.....	Full RCD load
	12% max (Battery mode)	Before battery low alarm
3.34 Transfer time		
☐ECO mode transfer to battery mode	< 10 ms (8 ms typical)	
☐Line to bypass/ECO or bypass/ECO to line	< 4 ms	Full linear load
☐Auto retransfer to line mode	Phase locked	After overload recovery $\leq 100\%$
3.35 Load capability		
☐Current crest ration	3 : 1 max	
☐Resistive load	900W	N1C.LS1000
	1350W	N1C.LS1500
☐Inductive – capacitive load	PF ≥ 0.7	Guarantee static and dynamic output voltage features defined in 3.31
☐Non linear load	1000VA / PF 0.9-0.65 lag	SPS, PFC, RCD 2(8) $\mu\text{F/W}$ Dc capacitor N1C.LS1000
	1500VA / PF 0.9-0.65 lag	N1C.LS1500
3.36 Overload capability		

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☐On line mode with 110/115/120/125/127V output voltage for LV or 220/230/240V output voltage for HV Either VA or W detection	100% < Load < 110% 110% < Load < 130% (-0%/+10%) 130% < Load < 140% (-0%/+10%) 140% < Load (-0%/+10%)	Overload warning only (No shutdown). Warning, transfer to bypass or shut down(See note 1) after 5min (+/-25sec) @ Ambient temperature < 40°C or 2.5min(+/- 12.5sec) @ Ambient temperature >= 40°C. Warning, transfer to bypass or shut down(See note 1) after 30sec (+/- 5sec). Warning, transfer to bypass or shut down(See note 1) after 1.5sec (+/- 1sec).
☐Battery mode with 110/115/120/125/127V output voltage for LV or 220/230/240V output voltage for HV Either VA or W detection	100% < Load < 110% 110% < Load < 120% (-0%/+10%) 120% < Load (-0%/+10%)	Overload warning only (No shutdown). Warning, transfer to bypass or shut down(See note 1) after 10 sec (+/- 2sec) Warning, transfer to bypass or shut down(See note 1) after 1.5sec (+/- 1sec).
☐On line mode with 100V output voltage for LV or 200/208V output voltage for HV Either VA or W detection	90% < Load < 99% 99% < Load < 117% (-0%/+10%) 117% < Load < 126% (-0%/+10%) 126% < Load (-0%/+10%)	Overload warning only (No shutdown). Warning, transfer to bypass or shut down(See note 1) after 5min (+/- 25sec) @ Ambient temperature < 40°C or 2.5min(+/- 12sec) @ Ambient temperature >= 40°C. Warning, transfer to bypass or shut down(See note 1) after 30sec (+/- 5sec). Warning, transfer to bypass or shut down(See note 1) after 1.5sec (+/- 1sec).
☐Battery mode with 100V output voltage for LV or 200/208V output voltage for HV Either VA or W detection	90% < Load < 99% 99% < Load < 108% (-0%/+10%) 108% < Load (-0%/+10%)	Overload warning only (No shutdown). Warning, transfer to bypass or shut down(See note 1) after 10 sec (+/- 2sec) Warning, transfer to bypass or shut down(See note 1) after 1.5sec (+/- 1sec).
☐Frequency converter mode Either VA or W detection	70% < Load < 78% 78% < Load < 88% (-0%/+10%) 88% < Load < 100% (-0%/+10%) 100% < Load (-0%/+10%)	Overload warning only (No shutdown). Load shutdown after 5min (+/- 25sec) @ Ambient temperature < 40°C or 2.5min (+/- 12sec) @ Ambient temperature >= 40°C. Load shutdown after 30sec(+/- 5sec) Load shutdown after 1.5sec(+/-1sec)
☐Bypass mode Current detection	110% < Load < 120% (-0%/+10%) 120% < Load < 130% (-0%/+10%) 130% < Load (-0%/+10%)	Load shutdown after 30min(+/- 150sec) Load shutdown after 10min(+/- 50sec) Load shutdown after 1min(+/- 5sec)
3.37 Short circuit		
☐Line or battery mode ☐RMS Value	24A (5 Cycle)..... 36A (5 Cycle).....	N1C.LS1000 N1C.LS1500 The short current must within the inverter transistor current rating.

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☐Bypass mode	User input circuit breaker, electric protection and internal fuse	Electric protection based on the input power cord or socket capacity, the detail see Appendix A
3.38 Output receptacle		
☐Output current protection	Electric protection	

Note 1 : When the unit transfer to bypass mode following an overload, it can auto transfer back to normal mode after 20 second is elapsed on bypass and if output load level is back to $\leq 100\%$. After 3 times transfer during 20 minutes, the unit stay on bypass mode.

3.4 Batteries features

Item	Specification	Comments
3.41 Battery		
☐Leakage current	100 uA max	No AC applied and the unit in the off position
☐Battery type(LiFePO4 Battery)	LIFE-02560052NB*1..... LIFE-03840052NB*1.....	N1C.LS1000 N1C.LS1500
3.42 Charger		
☐Charging control	2 stage charging management Refer to Appendix C	
☐Charger voltage	28V $\pm 1\%$ 42V $\pm 1\%$	N1C.LS1000 N1C.LS1500
☐Charging Current	1/2/4(Default) A $\pm 10\%$ 1/2/4(Default)/A $\pm 10\%$ 1A $\pm 0.5A$	40°C $\geq$ Ambient temperature $\geq 10^\circ\text{C}$ 45°C $\geq$ Ambient temperature $\geq 40^\circ\text{C}$ Ambient temperature $< 10^\circ\text{C}$, or $> 45^\circ\text{C}$ Charger current de rating see Appendix D
☐Ripple current(%)	$\leq 8\%$ @ CC mode	$I_o(\text{pk-pk})/2/I_o(\text{average}) \times 100\%$. I_o : Charger output current.
☐Recharge time UPS will charge with 1A for 40min when the battery is in OTP protection, to ensure the internal Battery not be protected for big charging current,(battery have OTP after full load Discharged), After battery recover from OTP, charging current will change to 4A	3/3 hours	N1C.LX1500/2000/3000 After 100% RCD load discharged, then recharge time to retrieve 100% of capability@4A charging current.
3.43 Backup time		
☐Minimum backup time	Based on external battery bank	At 25°C and full RCD load conditions
3.44 Battery protection		
☐Battery current protection	80A fast fuses 80A fast fuses	N1C.LS1000 N1C.LS1500

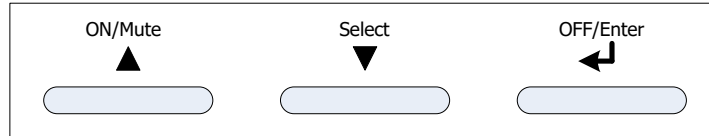
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☐Battery over voltage protection	29.2/43.8V $\pm$ 0.4V 30/45V $\pm$ 0.4V	Charger stopped, transfer to battery mode to decrease battery voltage. N1C. LS1000/1500 Battery fault, stop charger and output N1C. LS1000/1500
☐Low battery level	22.4V $\pm$ 0.4V 33.6V $\pm$ 0.4V	N1C.LS1000 N1C.LS1500@90% load
☐Cut-off battery level	21.2V $\pm$ 0.4V 31.8V $\pm$ 0.4V	N1C.LS1000 N1C.LS1500@90% load
☐Energy saving	shut down after 5min without load when UPS work in battery mode and load capacity is less than 5%.	This function could enabled via Viewpower software (Default: Disable)
☐Battery test	Automatic..... Manual initiated.....	Default period: 1 weeks By "ON" switch or command

3.5 Main machine interface

Switch panel

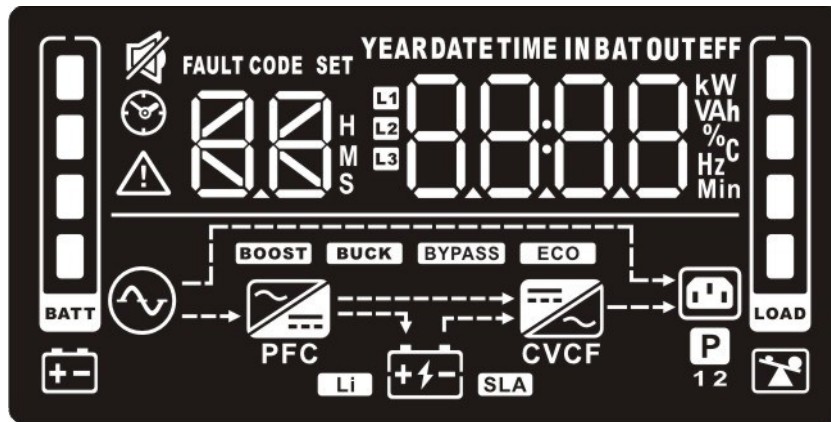


Button	Function
ON/Mute Button	➤ Turn on the UPS: Press and hold ON/Mute button for at least 2 seconds to turn on the UPS. ➤ Mute the alarm: After the UPS is turned on in battery mode, press and hold this button for at least 3 seconds to disable or enable the alarm system. But it's not applied to the situations when warnings or errors occur. ➤ Up key: Press this button to display previous selection in UPS setting mode. ➤ Switch to UPS self-test mode: Press ON/Mute buttons for 3 seconds to enter UPS self-testing while in AC mode, ECO mode, or converter mode.
OFF/Enter Button	➤ Turn off the UPS: Press and hold this button at least 2 seconds to turn off the UPS. UPS will be in standby mode under power normal or transfer to Bypass mode if the Bypass enable setting by pressing this button. ➤ Confirm selection key: Press this button to confirm selection in UPS setting mode.
Select Button	➤ Switch LCD message: Press this button to change the LCD message for input voltage, input frequency, input current, battery voltage, battery current, battery capacity, ambient temperature, output voltage, output frequency, load current and load percent. ➤ Setting mode: Press and hold this button for 3 seconds to enter UPS setting mode when Standby and Bypass mode. ➤ Down key: Press this button to display next selection in UPS setting mode.
ON/Mute + Select Button	➤ Switch to bypass mode: When the main power is normal, press ON/Mute and Select buttons simultaneously for 3 seconds. Then UPS will enter to bypass mode. This action will be ineffective when the input voltage is out of acceptable range. ➤ Exit setting mode or return to the upper menu: When working in setting mode, press ON/Mute and Select buttons simultaneously for 0.2 seconds to return to the upper menu. If it's already in top menu, press these two buttons at the same time to exit the setting mode.

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LCD Panel



Display	Function
Autonomy time information	
	Indicates the estimated or running autonomy time. H: hours, M: minute, S: second
Configuration and fault information	
	Indicates the configuration items, and the configuration items are listed in details in section UPS Setting.
	Indicates the warning and fault codes, and the codes are listed in details in section Faults Reference Code and Warning indicator.
Mute operation	
	Indicates that the UPS alarm is disabled.
UPS measurement information	
	Indicate the input voltage, input frequency, input current, battery voltage, battery current, battery capacity, ambient temperature, output voltage, output frequency, load current and load percent. k: kilo, W: watt, V: voltage, A: ampere, %: percent, °C: centigrade degree, Hz: frequency
Load information	
	Indicates the load level by 0-24%, 25-49%, 50-74% and 75-100%.
	Indicates overload.
Programmable outlets information	
	Indicates that programmable management outlets are working.
Mode operation information	
	Indicates the UPS connects to the mains.
	Indicates the battery is working.
	Indicates charging status
	Indicates the bypass circuit is working.

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	Indicates the ECO mode is enabled.
	Indicates the AC to DC circuit is working.
PFC	Indicates the PFC circuit is working.
	Indicates the inverter circuit is working.
CVCF	Indicates the UPS is working in converter mode.
	Indicates the output is working.
Battery information	
	Indicates the battery level by 0-24%, 25-49%, 50-74%, and 75-100%.
	Indicates low battery.
	Indicates LiFePO4 battery used.

Audible Alarm

Battery Mode	Sounding every 5 seconds
Low Battery	Sounding every 2 seconds
Overload	Sounding every second
Fault	Continuously sounding
Bypass Mode	Sounding every 10 seconds

LCD display wordings index

Abbreviation	Display content	Meaning
ENA	ENR	Enable
DIS	diS	Disable
ESC	ESC	Escape
HLS	HLS	High loss
LLS	LLS	Low loss
AO	AO	Active Open
AC	AC	Active Close
EAT	EAT	Estimated autonomy time
RAT	RAT	Running autonomy time
OK	OK	OK
ON	ON	ON
SD	SD	Shut down
BL	BL	Battery Low

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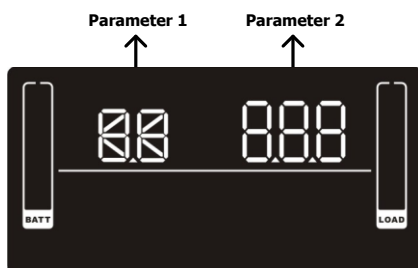
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OL	OL	Over Load
OI	OI	Over input current
NC	NC	Battery No Connect
OC	OC	Over Charge
SF	SF	Site wiring fault
EP	EP	EPO
TP	TP	Temperature
CH	CH	Charger
BF	BF	Battery Fault
BV	BV	Bypass Out Range
FU	FU	Bypass frequency unstable
BR	BR	Battery Replacement
EE	EE	EEPROM error

UPS Setting



There are two parameters to set up the UPS.

Parameter 1: It's for program alternatives. Refer to below table.

Parameter 2 is the setting options or values for each program.

● 01: Output voltage setting

Interface	Setting
	Parameter 2: Output voltage For 120 Models, You may choose the following output voltage: 100: presents output voltage is 100Vac 110: presents output voltage is 110Vac 115: presents output voltage is 115Vac 120: presents output voltage is 120Vac (Default) 125: presents output voltage is 125Vac 127: presents output voltage is 127Vac

● 02: Frequency Converter enable/disable

Interface	Setting
-----------	---------

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Parameter 2: Enable or disable converter mode. You may choose the following two options:

CF ENA: converter mode enable

CF DIS: converter mode disable (Default)

03: Output frequency setting

Interface	Setting
	Parameter 2 : Output frequency setting. You may set the initial frequency on battery mode: BAT 50: presents output frequency is 50Hz BAT 60: presents output frequency is 60Hz If converter mode is enabled, you may choose the following output frequency: CF 50: presents output frequency is 50Hz CF 60: presents output frequency is 60Hz

04: ECO enable/disable

Interface	Setting
	Parameter 2: Enable or disable ECO function. You may choose the following two options: ENA: ECO mode enable DIS: ECO mode disable (Default)

05: ECO voltage range setting

Interface	Setting
	Parameter 2: Set the acceptable high voltage point and low voltage point for ECO mode by pressing Down key or Up key. HLS: High loss voltage in ECO mode in parameter 2. For 120 Models, the setting range in parameter 3 is from +3V to +12V of the nominal voltage. (Default: +6V) LLS: Low loss voltage in ECO mode in parameter 2. (Default: -12V) For 120 Models, the setting voltage in parameter 3 is from -3V to -12V of the nominal voltage. (Default: -6V)

06: Bypass enable/disable when UPS is off

Interface	Setting
	Parameter 2: Enable or disable Bypass function. You may choose the following two options: ENA: Bypass enable DIS: Bypass disable (Default)

07: Bypass voltage range setting

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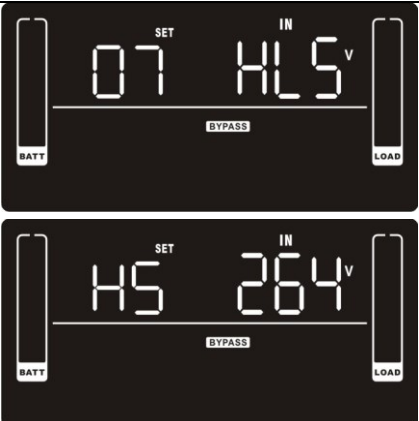
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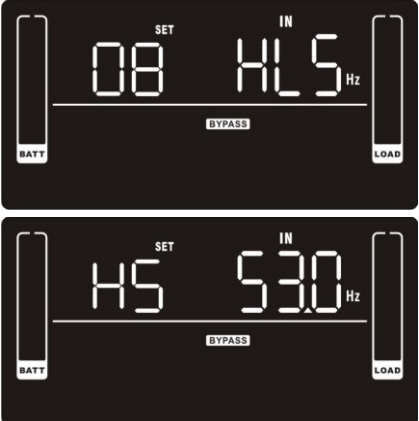
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Interface	Setting
	Parameter 2: Set the acceptable high voltage point and acceptable low voltage point for Bypass mode by pressing the Down key or Up key. HLS: Bypass high voltage point For 120 Models: 120-140: setting the high voltage point in parameter 3 from 120Vac to 140Vac. (Default: 132Vac) LLS: Bypass low voltage point For 120 Models: 85-115: setting the low voltage point in parameter 3 from 85Vac to 115Vac. (Default: 85Vac)

● 08: Bypass frequency range setting

Interface	Setting
	Parameter 2: Set the acceptable high frequency point and acceptable low frequency point for Bypass mode by pressing the Down key or Up key. HLS: Bypass high frequency point For 50Hz output frequency models: 51-55Hz: setting the frequency high loss point from 51Hz to 55Hz(Default: 53.0Hz) For 60Hz output frequency models: 61-65Hz: setting the frequency high loss point from 61Hz to 65Hz(Default: 63.0Hz) LLS: Bypass low Frequency point For 50Hz output frequency models: 45-49Hz: setting the frequency low loss point from 45Hz to 49Hz(Default: 47.0Hz) For 60Hz output frequency models: 55-59Hz: setting the frequency low loss point from 55Hz to 59Hz(Default: 57.0Hz)

● 09: Programmable outlets enable/disable

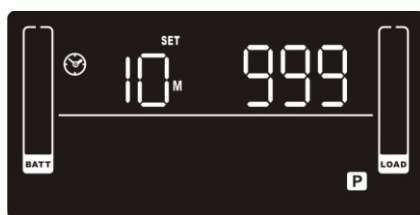
Interface	Setting
	Parameter 2: Enable or disable programmable outlets. ENA: Programmable outlets enable DIS: Programmable outlets disable (Default)

● 10: Programmable outlets setting

Interface	Setting
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Parameter 2: Set up backup time limits for programmable outlets.

0-999: setting the backup time limits in minutes from 0-999 for programmable outlets which connect to non-critical devices on battery mode. (Default: 999)

● 11: Autonomy limitation setting

Interface	Setting
The image shows a digital LCD display. On the left, there is a vertical bar labeled 'BATT'. In the center, the number '11' is displayed with a small 'M' (minutes) indicator. To the right of '11M', the number '999' is displayed. Below '999', there is a battery icon. Above the numbers, the word 'SET' is visible. On the far right, there is a vertical bar labeled 'LOAD'.	Parameter 2: Set up backup time on battery mode for general outlets. 0-999: setting the backup time in minutes from 0-999 for general outlets on battery mode. DIS: Disable the autonomy limitation and the backup time will depend on battery capacity. (Default) Note: When setting as "0", the backup time will be only 10 seconds.

● 12: Battery total AH setting

Interface	Setting
NA	

● 13: Charger maximum current setting

Interface	Setting
The image shows a digital LCD display. On the left, there is a vertical bar labeled 'BATT'. In the center, the number '13' is displayed. To the right of '13', the number '8' is displayed with a small 'A' (Amps) indicator. Below '8A', there is a battery icon. Above the numbers, the word 'SET' is visible. On the far right, there is a vertical bar labeled 'LOAD'.	Parameter 2: Set up the charger maximum current. 1/2/4: setting the charger maximum current 1/2/4in Ampere. (Default: 4A)

● 14: Charger Boost voltage setting

Interface	Setting
NA	

● 15: Charger Float voltage setting

Interface	Setting
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NA

● 16: EPO logic setting

Interface	Setting
	Parameter 2: Set up the EPO function control logic. AO: Active Open (Default). When AO is selected as EPO logic, it will activate EPO function with Pin 1 and Pin 2 in open status. AC: Active Close. When AC is selected as EPO logic, it will activate EPO function with Pin 1 and Pin 2 in close status.

● 17: Site fault detection enable/disable

Interface	Setting
	Parameter 2: Enable or disable site fault detection. You may choose the following two options: ENA: Site fault detection enable(Default for 120 models) DIS: Site fault detection disable(Default for 230 models)

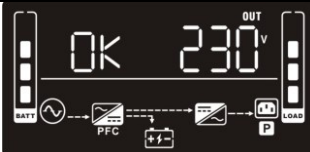
● 18: Display setting for autonomy time

Interface	Setting
	Parameter 2: Set up the display setting for autonomy time EAT: If EAT is selected, it will display the remaining autonomy time. (Default) RAT: If RAT is selected, it will show accumulated autonomy time so far.

● 00: Exit setting

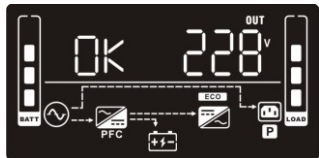
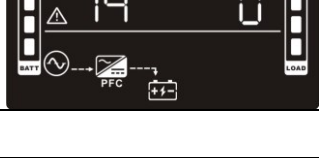
Interface	Setting
	Exit the setting mode.

Operating Mode Description

Operating mode	Description	LCD display
Online mode	When the input voltage is within acceptable range, UPS will provide pure and stable AC power to output. The UPS will also charge the battery at online mode.	

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ECO mode	Energy saving mode: When the input voltage is within voltage regulation range, UPS will bypass voltage to output for energy saving. The UPS will also charge the battery at ECO mode.	
Frequency Converter mode	When input frequency is within 40 Hz to 70 Hz, the UPS can be set at a constant output frequency, 50 Hz or 60 Hz. The UPS will still charge battery under this mode.	
Battery mode	When the input voltage is beyond the acceptable range or power failure, the UPS will backup power from battery and alarm is sounding every 5 seconds.	
Bypass mode	When input voltage is within acceptable range but UPS is overload, UPS will enter bypass mode or bypass mode can be set by front panel. Alarm is sounding every 10 seconds.	
Standby mode	UPS is powered off and no output supply power, but still can charge batteries.	
Fault mode	When a fault has occurred, the ERROR icon and the fault code will be displayed.	

Faults Reference Code

Fault event	Fault code	Icon	Fault event	Fault code	Icon
Bus start fail	01	x	Battery voltage too high	27	x
Bus over	02	x	Battery voltage too low	28	x
Bus under	03	x	Charger output short	2A	x
Inverter soft start fail	11	x	Over temperature	41	x
Inverter voltage high	12	x	Overload	43	
Inverter voltage Low	13	x	Charger failure	45	x
Inverter output short	14	x	Over input current	49	x

Warning indicator

Warning	Icon (flashing)	Code	Alarm
Low Battery		BL	Sounding every 2 seconds
Overload		OL	Sounding every second
Over input current		OI	Sounding 2 beep every 10 seconds
Battery is not connected		NC	Sounding every 2 seconds

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Over Charge		OC	Sounding every 2 seconds
Site wiring fault		SF	Sounding every 2 seconds
EPO enable		EP	Sounding every 2 seconds
Over temperature		EP	Sounding every 2 seconds
Charger failure		CH	Sounding every 2 seconds
Battery fault		bF	Sounding every 2 seconds (At this time, UPS is off to remind users something wrong with battery)
Out of bypass voltage range		bV	Sounding every 2 seconds
Bypass frequency unstable		FU	Sounding every 2 seconds
Battery replacement		bR	Sounding every 2 seconds
EEPROM error		EE	Sounding every 2 seconds

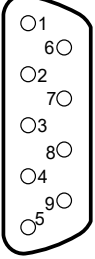
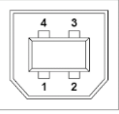
Note 1 : When the fault is happened on line mode, the UPS must transfer to bypass mode except Inverter short circuit if the input voltage within the range of bypass mode.

Note 2 : If the site fault is happened after the UPS turned on, the UPS can't transfer to on line mode.

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3.6 Communication

Item	Specification	Comments
3.61 Communication port		
☐RS232 port 	Voltronic/Megatec protocol specifications	RS232 DB9 connector 2: TXD for RS-232 3: RXD for RS-232 5: GND for RS-232
☐USB port 	Voltronic protocol specification with customized HID	USB connector is "B" receptacles 1: VBUS 2: D+ 3: D- 4: GND
3.62 External Communication slot		
☐SNMP option card	Voltronic/Megatec protocol for optional SNMP	WEB and status information
☐AS400 relay card	Voltronic definition for optional AS400	Dry contact signal and remote off control
3.63 Emergency Power Off		
☐EPO	Rear panel connector	Stop all converter, except charger
3.64 Telephone/network surge suppression		
☐Jack	A pair of RJ11/RJ45 combination jacks (in/out)	10/100M
3.65 Software		
☐View power		Included in CD Rom

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4. Environment performances

Item	Specification	Comments
4.11 Efficiency		
☐On line mode	25% - 50% - 75% - 100% R load 87% - 90.4% - 90.3% - 90%..... 87% - 90.4% - 90.3% - 90%.....	Battery fully charged (peak value) N1C.LS1000 N1C.LS1500
☐On battery mode	25% - 50% - 75% - 100% R load 80.6% - 90.2% - 90% - 89.2%..... 80.6% - 90.2% - 90% - 89.2%.....	(peak value) N1C.LS1000 N1C.LS1500 (The efficiency will reduce at beginning for all long back up time models, because the DCDC converter is not full duty when the battery voltage is high or the load is small).
☐On ECO mode	25% - 50% - 75% - 100% R load 92% - 95% - 95% - 95% 92% - 95% - 95% - 95%	Battery fully charged N1C.LS1000 N1C.LS1500
4.12 Temperature (IEC 62040-3)		
☐Storage	-10 to +45°C -10 to +35°C -10 to +25°C	Within 1 month 1-3 month 3-12 month Non-condensing
☐Operation	0 to 40°C	Low to high input line. From no load to Full load
4.13 Elevation (IEC 62040-3)		
☐Storage	15,000m maximum	
☐Operation	The UPS can operate < 3KM < 1KM 1KM to 3KM.....	Normally operate The load reduce 1% @ increasing 100M
4.14 Humidity (IEC 62040-3)		
☐Storage	10% to 95%(No condensing)	
☐Operation	20% to 95%(No condensing)	
4.15 Audible noise (ISO 7779)		
☐On line and battery mode	50dBA max (AVG value). 60dBA max (Peak value)	AVG (no load ,half load and full load) (Rear side @full load) Battery fully charged, without buzzer @ background noise: 15.3dB
4.16 EMI		
☐EMI	Standards: FCC Part15, Class A	N1C.LS1000 N1C.LS1500
4.17 EMS		
☐ESD	IEC 61000-4-2 Level 3	Contact Discharge 6KV; Air Discharge 8KV
☐RS	IEC61000-4-3 Level 3	Carrier field strength V/M-10 Maximum RMS field strength V/M-18

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☐EFT	IEC 61000-4-4 Level 4	Power Port , PE--4KV Signal and control port-2KV 1.2/50us-8/20us 4KV
☐SURGE	IEC 61000-4-5 Level 4	
☐CS	IEC 61000-4-6 Level 3	
4.18 Safety		
☐Safety	Complied with UL1778: 2017 & CSA C22.2 No. 107.3-14	For Low voltage models
4.19 Other		
☐Performance	IEC/EN 62040-3.....	For technical features
☐MTBF	≥ 50000 hours	@25 ⁰ C except battery
☐Transportation	IEC 60068-2-32	Drop test
	IEC 60068-2-64	Vibration test
	IEC 60068-2-27	Shock test
☐Miscellaneous	EN 50272.....	Volume / air flow / degassing standard

5. Mechanical features

Item	Specification	Comments
5.11 Input connection		
☐power cord	NEMA (15A) NEMA (15A)	N1C.LS1000 N1C.LS1500
5.12 Output connection		
☐UPS group receptacle	8 x NEMA 5-15R..... 8 x NEMA 5-15R.....	N1C.LS1000 N1C.LS1500
5.13 Battery connection		
☐External Battery connection	NA	
5.14 Size and weight		
☐Product size (D x W x H)	302 x 438 x 86.2 (mm)	N1C.LS1000
	302 x 438 x 86.2 (mm)	N1C.LS1500 Note: Plastic front panel included
☐Product weight	11.1Kg	N1C.LS1000
	12.1Kg	N1C.LS1500
☐Packaging size (D x W x H)	570 x 470 x 240 (mm)	N1C.LS1000
	570 x 470 x 240 (mm)	N1C.LS1500
☐Packaging weight	About 13Kg	N1C.LS1000
	About 14Kg	N1C.LS1500
5.15 Miscellaneous		

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☐Aesthetic	By customer define Air flow quantity(Minimum) as following: Tower small case: more than 4000 mm ² Tower big case: more than 7500mm ² R/T: more than 2115mm ²	New panel design should be comply to air flow quantity(Minimum)
☐Color	Black.....	For plastic front panel and metal chassis
☐Logo	By customer define	Customer logo
☐Ventilation	Fan to cooling	Smart fan speed control, see Appendix E
☐Protection grade	IEC 60529	IP20

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6. Appendix A: Input current protection

Models		Input power cord or socket	Rated Current	110%	120%	125%	150%
	1000VA	5-15P	12	13.2	14.4	15	18
	1500VA	5-15P	12	13.2	14.4	15	18

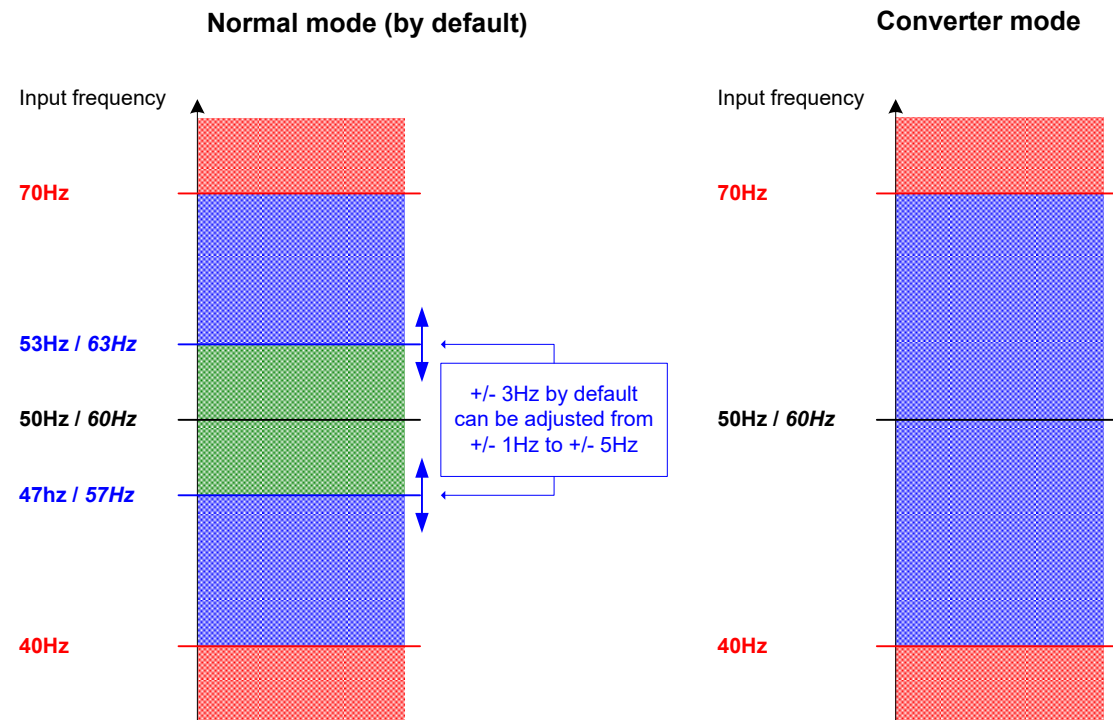
Note:

- At 110% ~120% input rated current, UPS only warning by 2 beep per 10 seconds.
- At 120% ~150% input rated current, UPS hold 1 hours online mode and warning by 2 beep per 10 seconds then switch to battery mode.
- At over 150% input rated current, UPS hold 6 minutes online mode and warning by 2 beep per 10 seconds then switch to battery mode.
- At 120% ~150% input rated current, UPS hold 1 hours bypass mode and warning by 2 beep per 10 seconds then turn off the output.
- At over 150% input rated current, UPS hold 6 minutes bypass mode and warning by 2 beep per 10 seconds then turn off the output.

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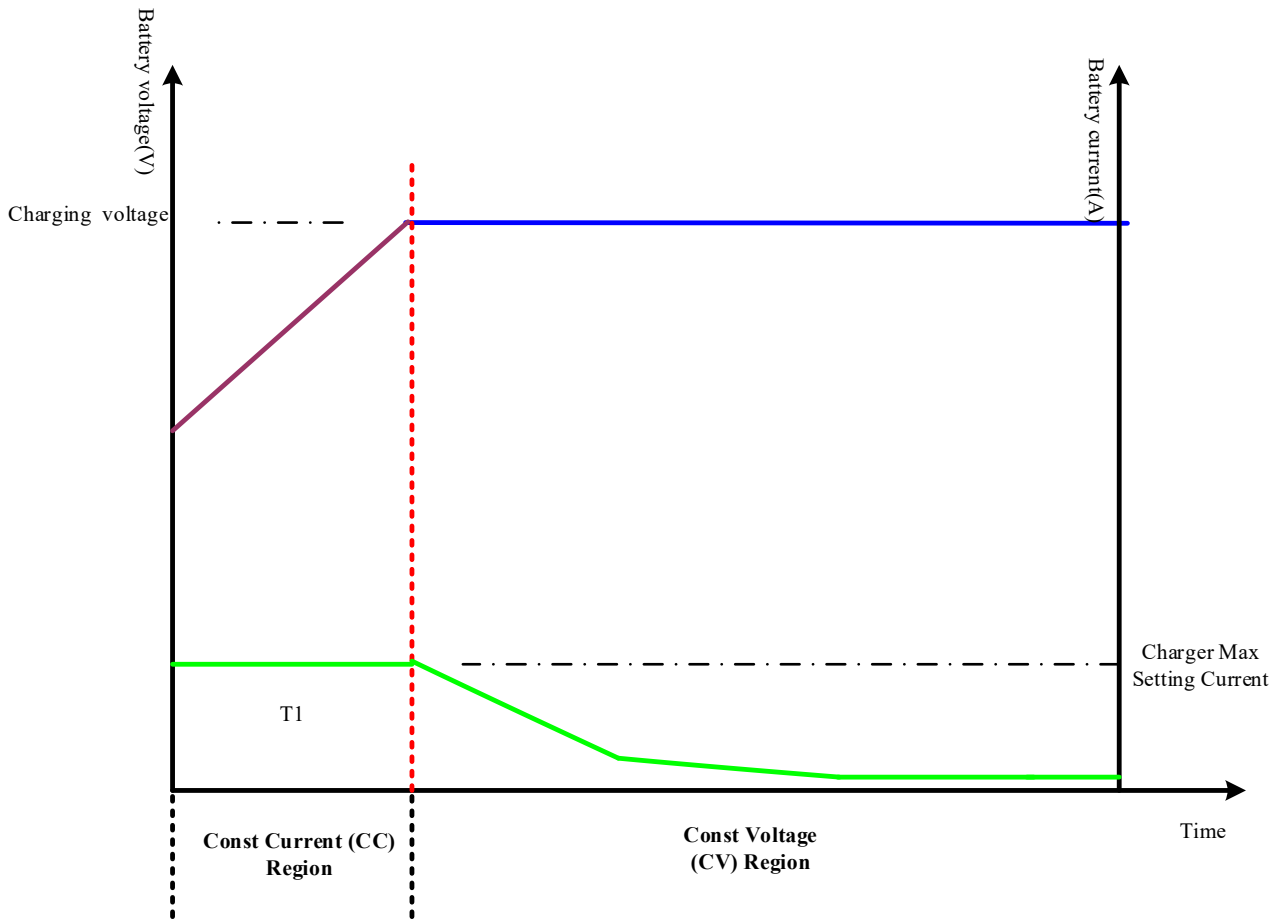
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7. Appendix B: Output frequency



-  UPS on line mode.
Input and output frequency are synchronized
-  UPS on line mode
output frequency in stand alone mode 50/60Hz +/- 0.5%
-  UPS on battery mode, safety relay is open
output frequency in stand alone mode 50/60Hz +/- 0.5%

8. Appendix C: 2 stage charging management



T1: Time required to reach the constant voltage

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9. Appendix D: Charging current de rating

	<i>Input voltage range</i>	<i>Ambient temperature range</i>	<i>Max charging current</i>
			<i>48V</i>
LV models	55-80Vac	<10°C	1A
		10°C ~40°C	4A
		40°C ~45°C	4A
		>45°C	1A
	80-132Vac	<10°C	1A
		10°C ~40°C	4A
		40°C ~45°C	4A
		>45°C	1A
	132-150Vac	<10°C	1A
		10°C ~40°C	4A
		40°C ~45°C	4A
		>45°C	1A

Note: When the input current is more than power cord rating, the charger will limit automatically charging current to ensure the biggest load supply.

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10. Appendix E : Smart fan speed control

Speed = MAX(Speed1,Speed2,Speed3,Speed4, Speed5,speed6).

The fan speed is controlled by adjusting fan working voltage, and fan duty step is 5%.

No	Condition 1	Condition 2	Fan duty(%)
Speed1	Ambient temperature(°C)	< 30(Hysteresis:27)	0
		30 ~ 40	$35 + (\text{temperature} - 30)/10 * (60-35)$
		40~45	$60 + (\text{temperature} - 40)/5 * (100-60)$
		> 45	100
Speed2	Inverter or Converter Heat Sink temperature (°C)	< 55(Hysteresis:50)	0
		55 ~ 70	$35 + (\text{temperature} - 55) * 25 / 15$
		70 ~ 85	$60 + (\text{temperature} - 70) * 40 / 15$
		> 85	100
Speed3	Battery mode or Battery test mode or or CVCF mode Load level(%)	0 ~ 50	35
		50 ~ 80	$35 + (\text{Load percent} - 50) * 13 / 6$
		> 80	100
Speed4	Charger on	Charger current percent > 50%	100
		Charger current percent: 20 ~ 50	$40 + (\text{Charger current percent} - 20) * 2$
		other	35
Speed5	Line voltage	Load percent<50%	35
		<200(100V)	$35 + (\text{Load percent} - 50)/50*(60-35)$
		200~240(100~127)	$35 + (\text{Load percent} - 50)/50*(50-35)$
		>240 (127)	$35 + (\text{Load percent} - 50)/50*(40-35)$
Speed6	other		35

For example:

Ambient temperature is 25°C;

Inverter heat sink temperature is 60°C, Converter heat sink temperature is 50°C,

UPS work on line mode with 70% load percent

And battery full charged.

So:

Speed1 = 0;

Speed2 = $35 + (60-55) * 13 / 3 = 56$;

Speed3 = $35 + (55- 50) * 13 / 6 = 45$,

Speed4 = 40;

Speed5 = 35,

Speed = MAX(Speed1,Speed2,Speed3,Speed4, Speed5) = MAX(0, 56, 45, 40, 35) = 56. The fan voltage will be about 9V.

The below table is the relationship of the fan duty and the fan voltage.

Fan duty(%)	Fan voltage(V)	Fan duty(%)	Fan voltage(V)
0	0	55	9
5	4	60	9.5
10	4.5	65	10
15	5	70	10.5
20	5.5	75	11
25	6	80	11.5
30	6.5	85	12
35	7	90	12.5
40	7.5	95	12.5
45	8	100	12.5
50	8.5		

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11. Appendix F : Runtime chart

UPS Models Internal battery	N1C.LS1000	N1C.LS1500
Discharg time 100% load	6.53	6.63
Discharg time 90% load	7.10	7.37
Discharg time 80% load	7.94	8.29
Discharg time 75% load	8.54	8.74
Discharg time 70% load	9.51	9.36
Discharg time 60% load	10.53	10.92
Discharg time 50% load	12.77	12.94
Discharg time 40% load	15.71	16.18
Discharg time 30% load	20.61	21.57
Discharg time 25% load	25.12	26.53
Discharg time 20% load	32.15	33.17
Discharg time 10% load	63.29	66.33