OPS Solar Inverter
Specification & Manual

Contents

1 OPS Features

- Advanced Topology with DSP(Digital Single Processor) Control
- N+X redundancy function optional
- High power density with extraordinary reliability and performance
- Input/output isolated design, improved safety
- "All master" dynamic mechanism eliminate single point failure to optimize reliability

- Pure sine wave output (THD < 3%) for harsh environment and various equipments
- Output frequency: 50 / 60Hz switch selectable
- Low power “Power Saving Mode” to conserve energy
- Capable of driving highly inductive & capacitive loads at start moment.
- LED indicators give informative displays of operating status
- Various Protections: Input low voltage / Overload / Short circuit / Low battery alarm / Input over voltage / Over temperature

Application:

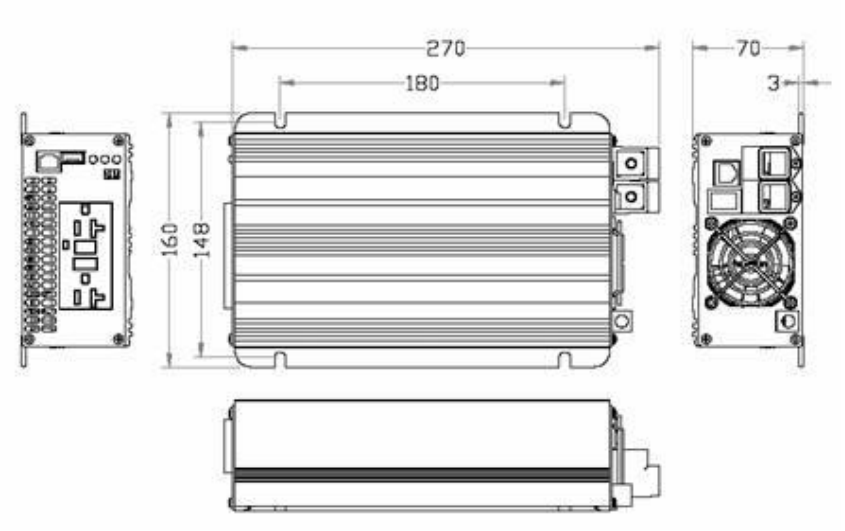
Power tools: Circular saws, Drills, Grinders, Sanders, Buffers, Weed and hedge trimmers, Air compressors.
Office equipment: computers, printers, monitors, facsimile machines, scanner.
Household items: vacuum cleaners, fans, fluorescent and incandescent lights, shavers, sewing machines.
Kitchen appliances: coffee makers, blenders, ice makers, toasters.
Industrial equipment: metal halide lamp, high – pressure sodium lamp.
Home entertainment electronics: television, VCRs, video games, stereos, musical instruments, satellite equipment.

2 OPS Technical Specification

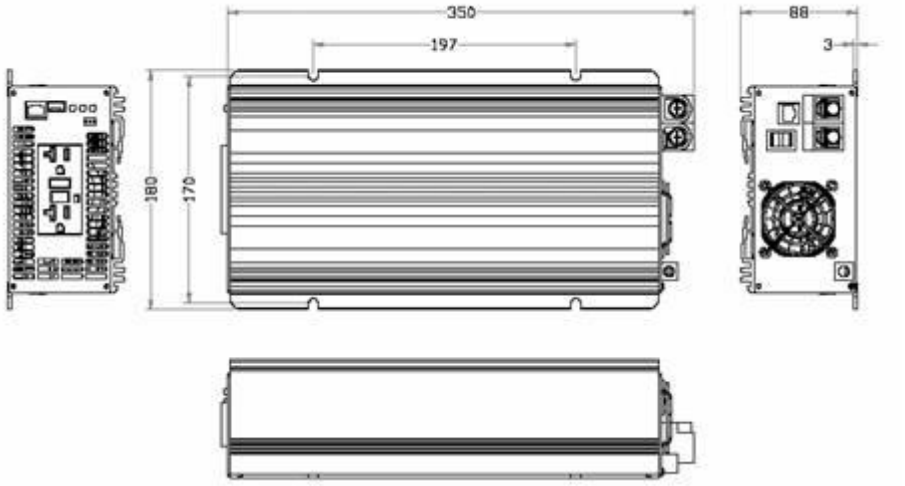
Specification	Model No.									
Item	**OPS 1206**	**OPS 1210**	**OPS 1215**	**OPS 1220**	**OPS 1230**	**OPS 1206E**	**OPS 1210E**	**OPS 1215E**	**OPS 1220E**	**OPS 1230E**
Input										
Nominal voltage	12Vdc									
Operating range	10Vdc ~ 15Vdc									
Startup voltage	11.75Vdc									
Output										
Output Waveform	Pure sine wave									
Output Power	600W	1000W	1500W	2000W	3000W	600W	1000W	1500W	2000W	3000W
Surge Rating	2* P_{rated}									
Nominal Output Voltage	110 / 115 / 120Vac					220 / 230 / 240Vac				
Output Voltage Regulation	±5%									
Output Frequency	50/60Hz ±0.1%(Freq Switchable)									
Output Current @ 220/230/240						2.73A / 2.61A / 2.50A	4.55A / 4.35A / 4.17A	6.825A / 6.525A / 6.255A	9.10A / 8.70A / 8.34A	13.65A / 13.05A / 12.51A
Output Current @ 110/115/120	5.45A / 5.22A / 5A	9.09A / 8.70A / 8.33A	13.64A / 13.04A /12.5A	18.18A / 17.39A / 16.67A	27.28A / 26.09A / 25A					
Crest factor	3:1									
THD	<3%, linear load; <5%, non-linear load; <10% (when battery lower than pre-alarm level) Note: non-linear load condition: P.F.>0.7									
Peak Output Current @ 220/230/240	---					5.46A / 5.22A / 5.00A	9.10A / 8.70A / 8.34A	13.65A / 13.05A / 12.5A	18.20A / 17.40A / 16.68A	27.3A / 26.1A / 25.02A
Peak Output Current @ 110/115/120	10.92A / 10.44A / 10A	18.2A / 17.4A / 16.68A	27.3A / 26.1A / 25A	36.4A / 34.8A / 33.36A	54.6A / 52.2A / 50.04A	---				
Efficiency	>88% (typical), 90% (peak)					>90% (typical), 92% (peak)				
No load Current Draw	<12W		<20W			<12W		<20W		
Stand-by Current Draw	<6W		<10W			<6W		<10W		
Over load protection	Refer to Sec.3.9 and Sec.3.10									
Environmental										
Noise	<50 dB									
Operating temperature	Operation temperature: –20 to +70℃ –5 to +40 ℃ with full performance.									
Storage temperature	-30 ~ 70℃									
Operating humidity	90% RH (no condense)									
Operating Attitude	1500m									
Mechanical										
Dimension L x W x H (mm)	270*160*70	350*180*88	350*180*88	400*200*166	400*200*166	270*160*70	350*180*88	350*180*88	400*200*166	400*200*166
Weight (Kg)	2.5	4.0	4.5	8.0	9.5	2.5	4.0	4.5	8.0	9.5
Force cooling	Load and Temperature Controlled Cooling Fan									
Certification										
Certification	CE*									
Safety	EN60950									

EMC	FCC Part 15 class B, EN55022 Class B
Control	
Protection	Overload, Short circuits, Reverse polarity, Over / under input voltage, Over temperature
Startup time	< 5 Seconds
Power Saving Recovery Time	5 Seconds
Human Interface	
LED Indicator	3-LED installed
Audible Alarm	Buzzer
Communication Interface	RS 232

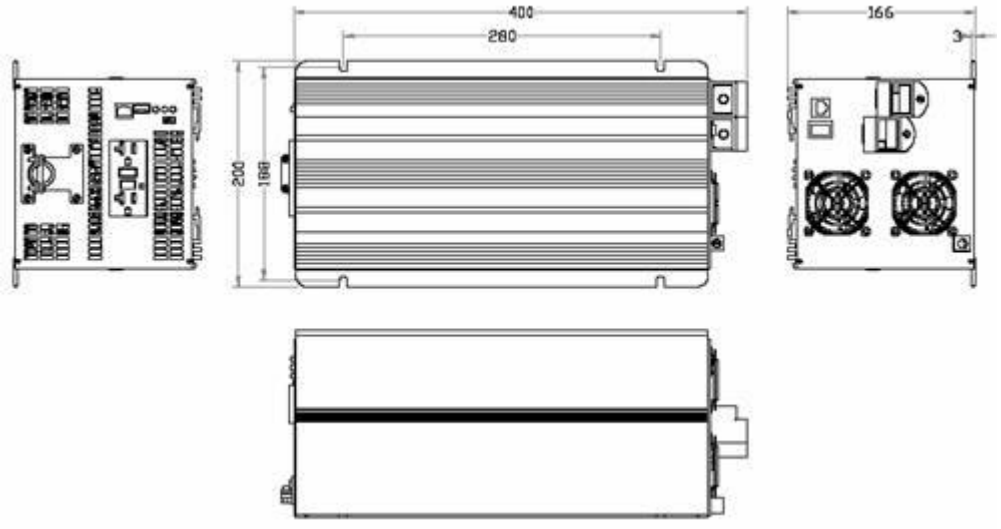
OPS 600W Dimension



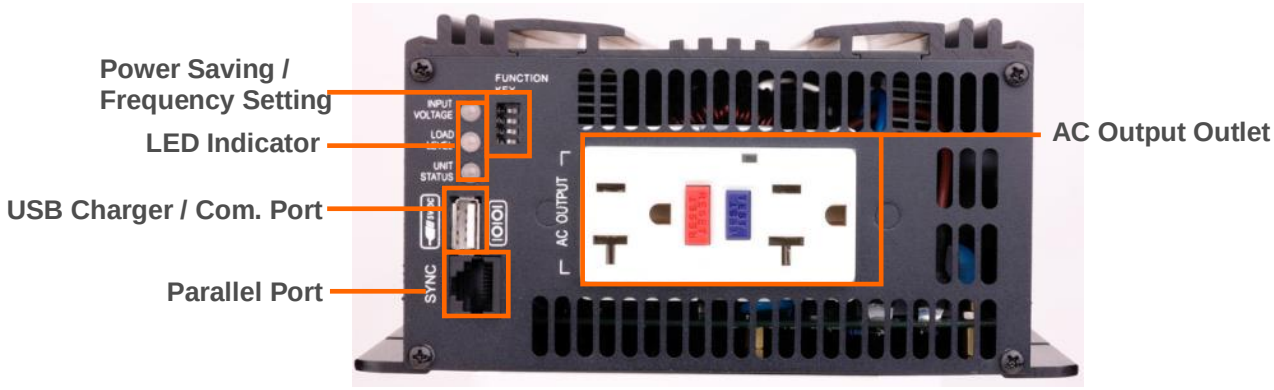
OPS 1000W & 1500W Dimension

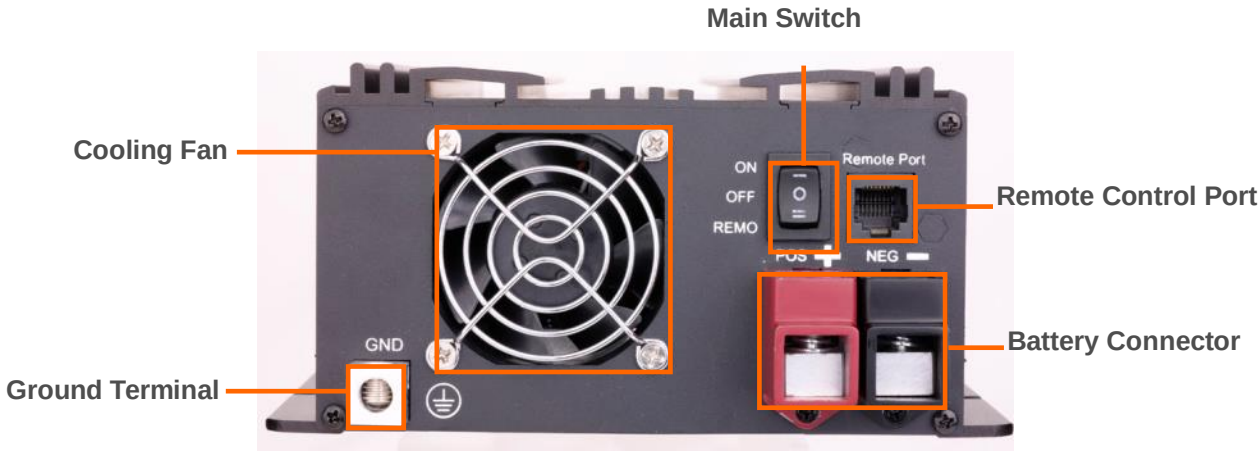


OPS 2000W & 3000W Dimension



3 Application





3.1 LED Display Status

There are 3 dual color led indicators on the front panel.

Status Indicator

Green LED	Solid	Inverter ok
	Blink (slow)	Power Saving
Orange LED	Solid	Eeprom fault
	Blink (slow)	Bus soft start fail
	Blink (fast)	Inverter soft start fail
Red LED	Solid	Over Temperature
	Blink (slow)	Bus over/under
	Blink (fast)	Short Circuit
Orange + Red LED	Orange and Red interchanged (slow)	Inverter voltage low/high
	Orange and Red interchanged (slow)	Negative power protection

Load Level Indicator

LED status	OFF	Green Solid	Orange Solid	Red Solid	Red Blink
OPS 600	0 ~ 30W	30 ~ 198W	198 ~ 450W	450 ~ 576W	Over 576W
OPS 1000	0 ~ 50W	50 ~ 330W	330 ~ 750W	750 ~ 960W	Over 960W
OPS 1500	0 ~ 75W	75 ~ 495W	495 ~ 1125W	1125 ~ 1450W	Over 1450W
OPS 2000	0 ~ 100W	100 ~ 660W	660 ~ 1500W	1500 ~ 1920W	Over 1920W
OPS 3000	0 ~ 150W	150 ~ 990W	990 ~ 2250W	2250 ~ 2880W	Over 2880W

Input Level Indicator:

LED Status	Battery Cut-off Level (12Vdc)			Recovery Level
Load level	0~29%	30~69%	70~100%	12.5Vdc for battery low 14.0Vdc for battery high
Red Solid	<10Vdc	<9.9Vdc	<9.7Vdc	
Red Blink	10 ~11.3Vdc	9.9 ~11.2Vdc	9.7~11.0Vdc	
Green Solid	11.3~14Vdc	11.2~13.9Vdc	11.0~13.7Vdc	
Orange Blink	14~15Vdc	13.9~14.9Vdc	13.7~14.7Vdc	
Orange Solid	>15Vdc	>14.9Vdc	>14.7Vdc	

3.2 Power Saving Mode

Power Saving Mode can be set by 3 Dip Switches, SW1, SW2 and SW3 on front panel. For example: when the power saving watt setting is 15W, if load level>15W, the inverter will go to normal operation.

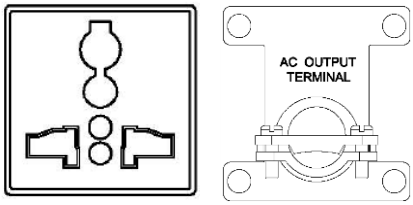
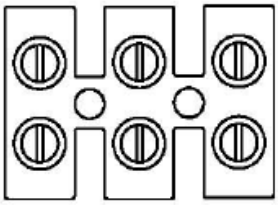
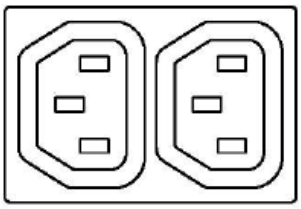
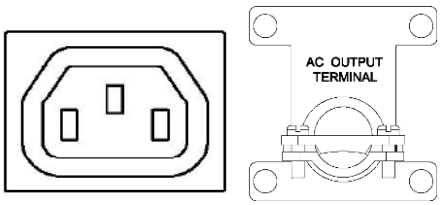
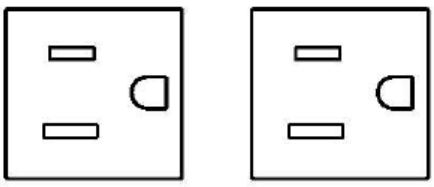
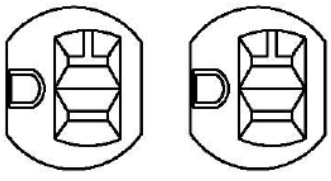
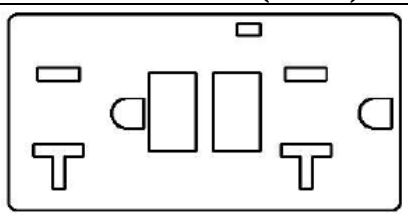
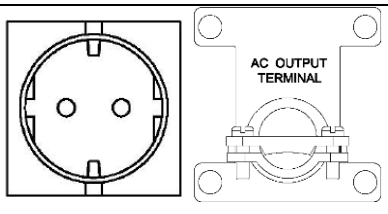
OPS1206, 1206E	OPS12110,1210E OPS1215, 1215E	OPS 1220,1220E OPS 1230,1230E	SW1	SW2	SW3
DISABLE	DISABLE	DISABLE	OFF	OFF	OFF
13W	20W	40W	ON	OFF	OFF
35W	50W	100W	OFF	ON	OFF
60W	80W	160W	ON	ON	OFF
85W	110W	220W	OFF	OFF	ON

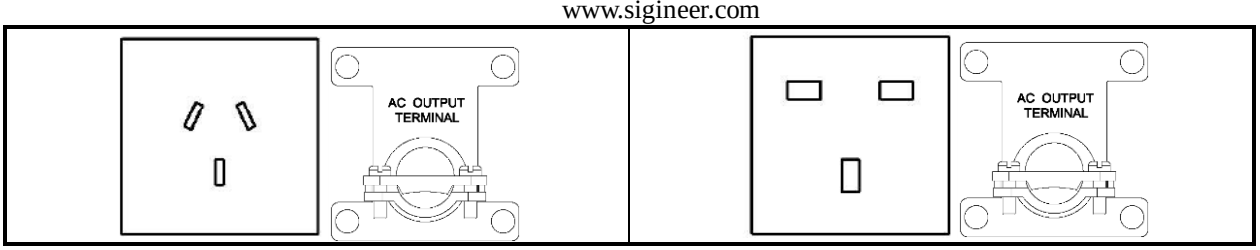
3.3 Output Frequency Setting

Frequency can be set by a Dip Switch SW4 on front panel.

Frequency	S4 Status
50Hz	OFF
60Hz	ON

3.4 AC Outlets Available

Universal	HARD WIRE
	
IEC-2	**IEC-1**
	
NEMA 5-15R	**NEMA 5-20R**
	
North America (GFCI)	**Schuko**
	
Australia / New Zealand	**United Kingdom**



3.5 Audible Alarm

#	Alarm mode	Beep mode	Remark
1	Alarm	Beep 1 time/ 1s	1. Input level <11.3 or >14.0Vdc
			2. Load > 150%
2	Fault	Beep always	All fault mode
3	Switch on / off	Chirp one time	When Switch on / off the unit
	Remote on / off	Chirp one time	When Remote Switch on/off the unit

3.6 Output Voltage Setting

Output voltage should be set by RS232 communication. Please refer to monitor software user manual.

3.7 Fan Control

Load Level and Temperature	Fan Speed
Load<= 10% and temperature<= 40 ℃	0
Else	Full speed

3.8 Power Limitation

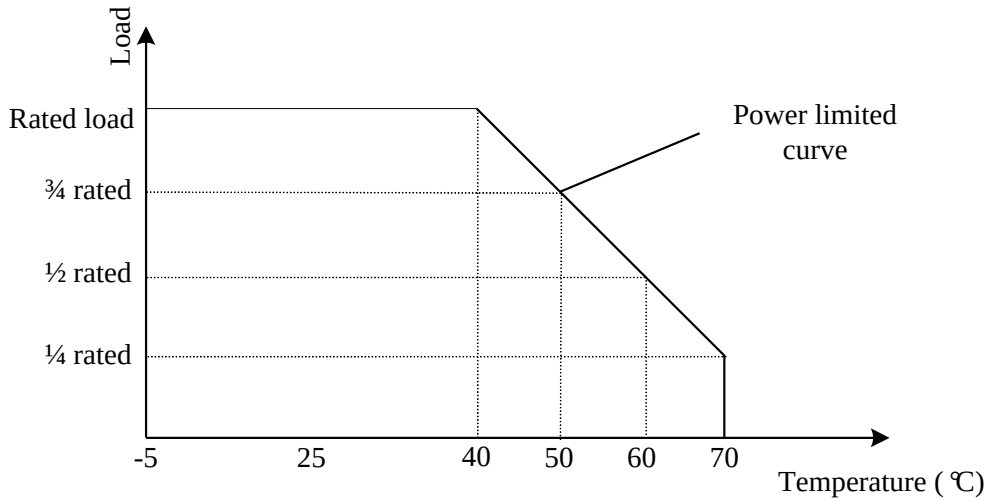


Figure 1 Power de-rating vs. Ambient Temperature

3.9 Short Circuit Protection

Short circuit protection consiOPS of 2 stages:

Stage 1. The short current is set as 16A(28A for 120Vac) for inverter, if output voltage<40Vac and output current>2A for 4 cycles, inverter will judge as short circuit fault may have happened, and the short circuit protect will go to the second stage.

Stage 2. The short current is set as 8A(15A for 120Vac) for inverter, if output voltage<50Vac and output current>2A for 30 seconds, inverter will judge as short circuit happen, otherwise the short circuit alarm will vanish.

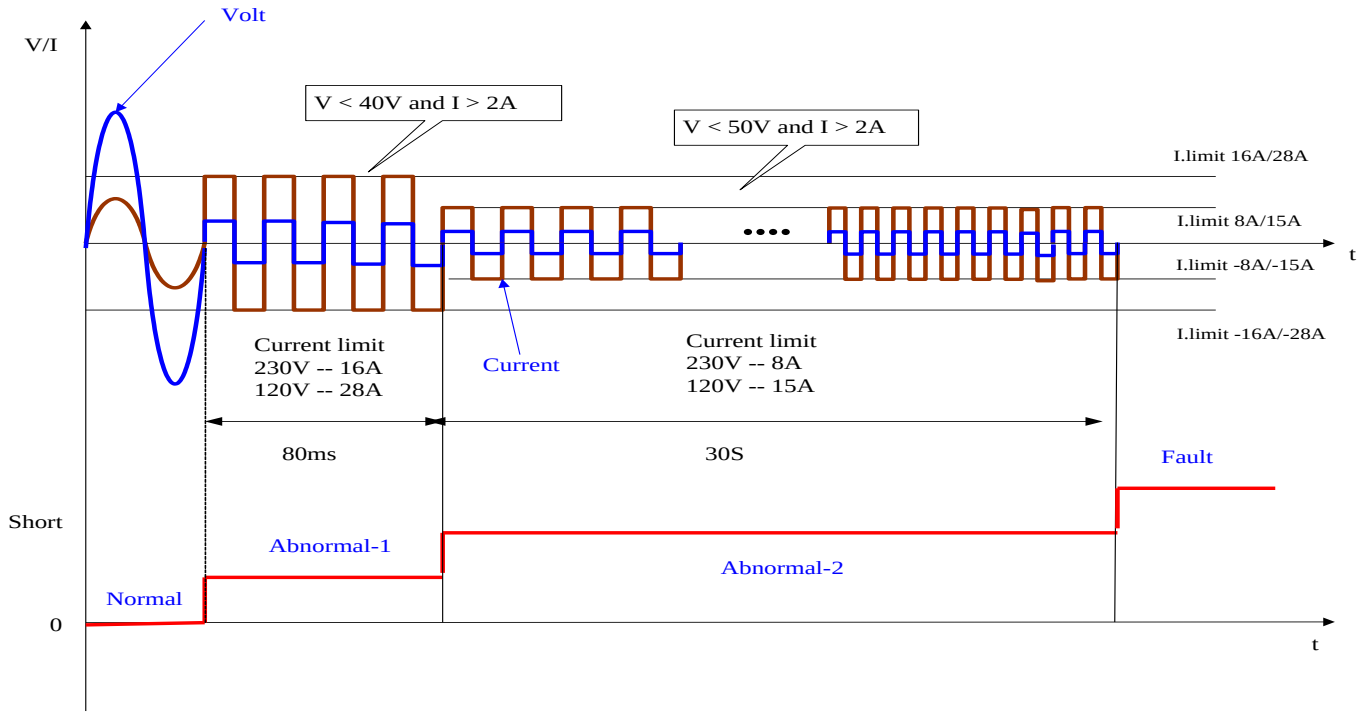


Figure 2 Power limited during Short Circuit

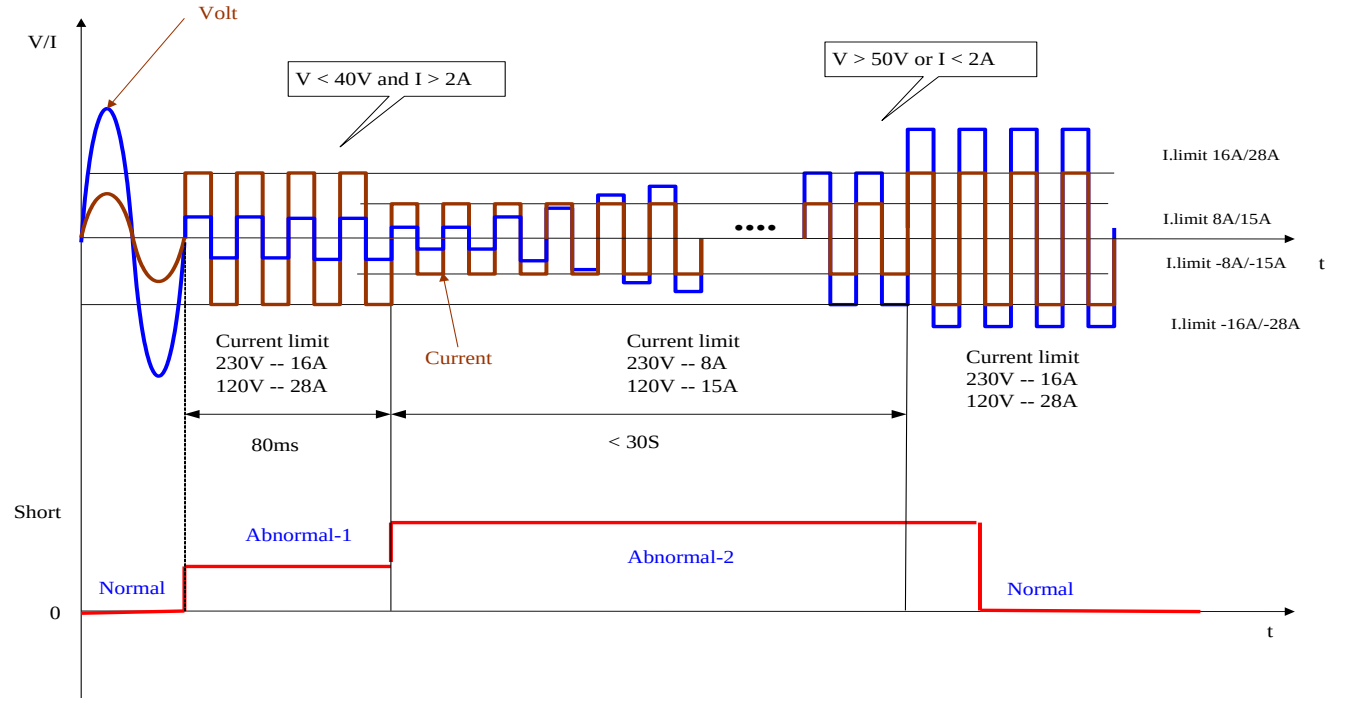


Figure 3 Unit Resumed from Short Circuit Condition

3.10 Over Load Protection

Over load protection consiOPS of 2 stages:

Stage 1. The overload protection will happen when the load power exceed the power rated. With 20s of 125% overload / 10s of 150% overload / 5s of 200% overload, the inverter will judge as overload and set the current limit to 8A (120Vac is 15A), then it goes to the second stage.

Stage 2. The inverter continues working with the current limit (8A/15A). If the load power is less than 10% for 10s, it will recover the current limit to 16A(120Vac is 28A), and works normally.

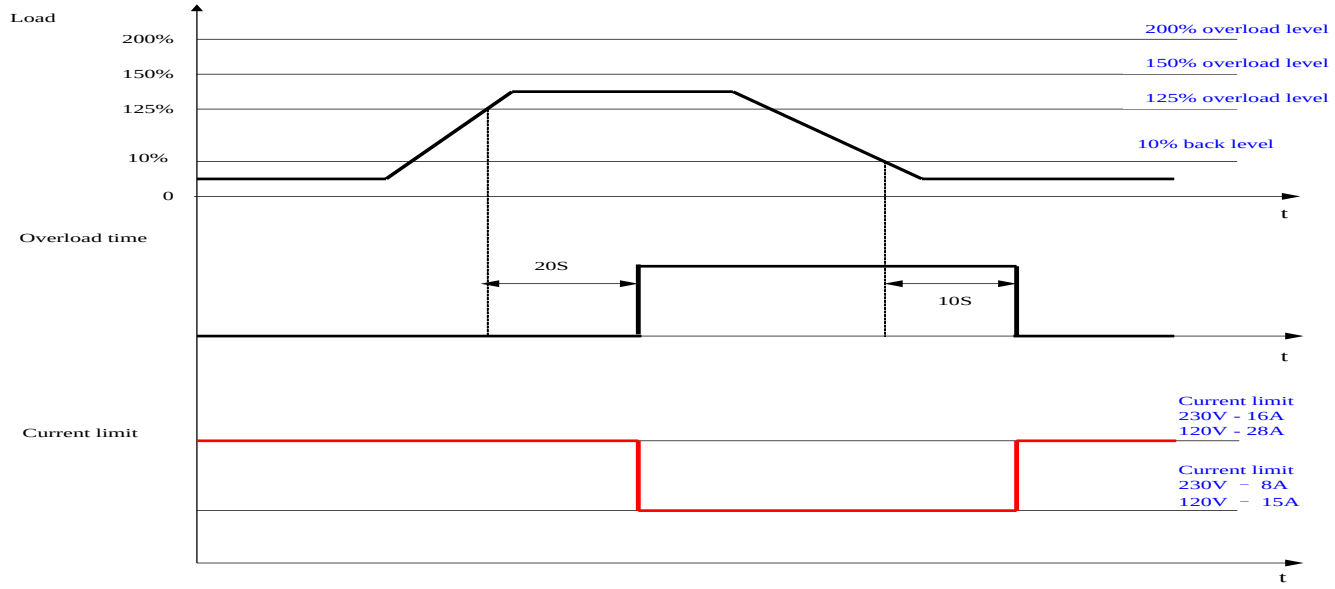


Figure 4 Overload (125%) protection and recovery timing

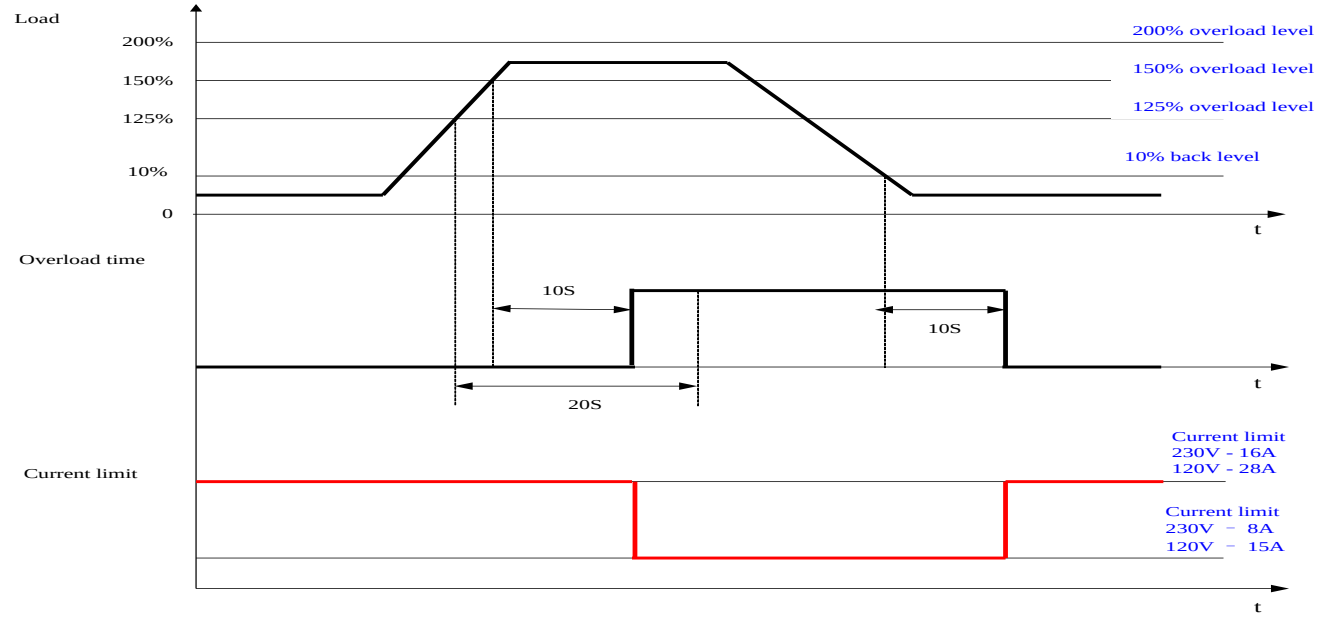


Figure 5 Overload (150%) protection and recovery timing

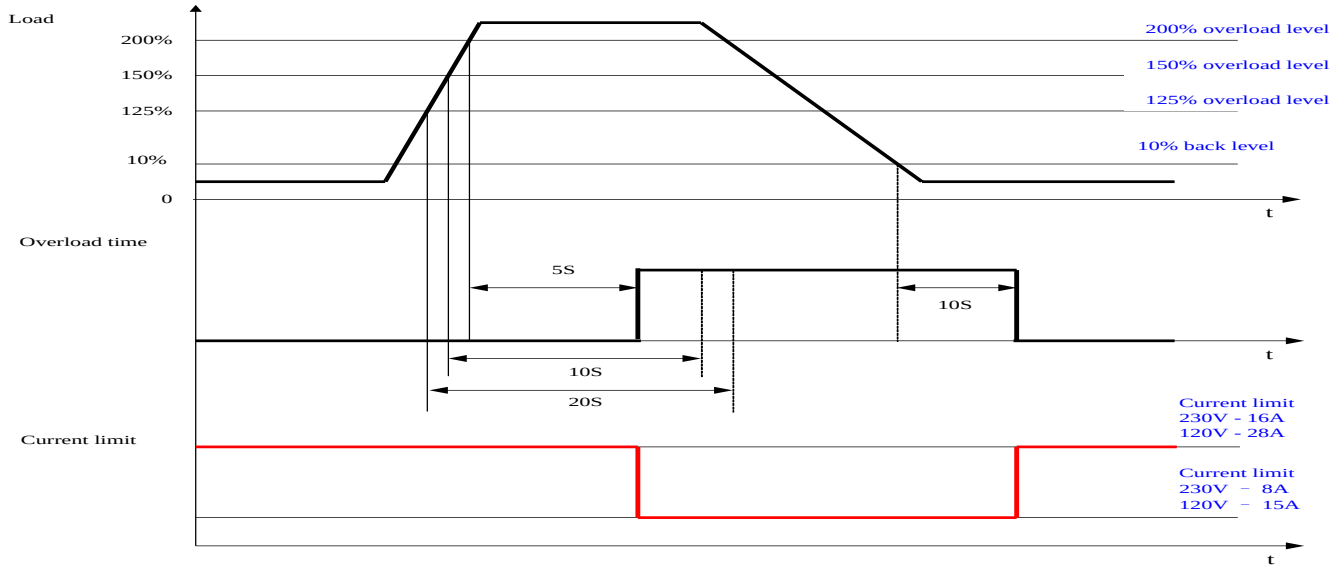


Figure 6 Overload (200%) protection and recovery timing

4 Optional Features

4.1Redundant Design (optional)

OPS is N+X designed inverter which embeds latest power technology. The inverter can be stacked in N+X redundant configuration up to a Maximum of 4 pcs.

With advance DSP control technique, inverter can expand as AC load requirement increases. With built in control circuit to each inverter module, the inverter modules are capable of parallel and synchronized operation without a central controller required.

4.2 In-Parallel Application

A distribution unit and a cable are for parallel application.
The cable is necessary in parallel operation, or not it is dangerous for user.

4.3 Remote Control

OPS can be switched on or off remotely by wired remote controller