

# **SANUPS**

## **A11J Series 200 V Type**

### **5-20 kVA**

Uninterruptible Power Systems

**Technical Specification**

March '11



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## 1. The System

- 1.1. This specification describes a single-phase, Double conversion, solid state Uninterruptible Power Supply herein after referred to as the UPS. The UPS can run parallel operation. Four units at a maximum enable to provide the output capacity of 20kVA. The UPS shall operate in conjunction with the existing building electrical system to provide power conditioning and back-up power protection. The system shall consist of a solid-state inverter, rectifier, battery charger, and a 100 % rate, automatic, continuous duty static switch.

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## 2. UPS Requirements and Performance Characteristics

### 2.1. Rating

- 2.1.1. The UPS is available in:

Number of units	1	2	3	4
Apparent power	5 kVA	10 kVA	15 kVA	20 kVA
Active power @ 0-40 °C	4.5 kW	9 kW	13.5 kW	* 18 kW

\* UL/CE certified UPS unit: 17kW

N+1 parallel redundant operation

Number of units	2	3	4
Apparent power	5 kVA	10 kVA	15 kVA
Active power @ 0-40 °C	4.5 kW	9 kW	13.5 kW

### 2.2. Input Features

- 2.2.1. 200V, 220V, 230V, 240V, 208V (Selectable)
- 2.2.2. ON LINE AC input Range  
Load Factor 70% or less: +15%/-40% (200V: 120V to 230V)  
More than 70%: +15%/-20% (200V: 160V to 230V)
- 2.2.3. Input Frequency: 50 / 60 Hz
- 2.2.4. Input Frequency Range  
Auto-detect frequency setting: +/- 8 %  
Constant frequency setting: 40 Hz to 120 Hz  
At auto detect frequency setting, the synchronized frequency range is selectable as +/- 1 %, +/- 3 % or +/- 5 % (factory setting: +/- 3 %).

### 2.2.5. Input Current Values

kVA	At Min. input Voltage (160 V)	At Rated voltage (200 V)
5	32.6 A	26.1 A
10	65.3 A	52.2 A
15	97.9 A	78.3 A
20	130.5 A	104.4 A*

\* UL/CE certified UPS unit: 98.8A

### 2.2.6. Recommended AC input MCCB

UPS	Non-UL/CE	UL/CE certified
5 kVA (Single / Terminal)	40 A	35 A (UL489)
5 kVA (Single / NEMA Plug)	30 A	N / A
5 kVA (Parallel)	40 A	35 A (UL489)
10 kVA (Parallel)	80 A	70 A (UL489)
15 kVA (Parallel)	120 A	100 A (UL489)
20 kVA (Parallel)	160 A	125 A (UL489)

### 2.2.7. Inrush Current

5 kVA 90 A, 10 kVA 180 A, 15 kVA 270 A, 20 kVA 360 A for 20 ms

### 2.2.8. Input Current Total Harmonic Distortion: < 10 %

### 2.2.9. Power factor: > 0.95

## 2.3. Output Characteristics

### 2.3.1. Voltages: 200V, 220V, 230V, 240V, 208V Single phase

### 2.3.2. Voltage Regulation: +/- 2%

### 2.3.3. Frequency: 50 / 60 Hz (60 Hz by default).

### 2.3.4. Frequency Regulation

According to the synchronized frequency range that is selected from +/- 1 %, +/- 3 % or +/- 5 % (factory setting: +/- 3 %).

At UPS free running: +/- 0.5 %

### 2.3.5. Slew Rate: < 1 Hz / second

### 2.3.6. Overload detection: Current limited

Overload occurs when output VA or Watts are beyond 106 % of nominal load.

The UPS may stay Double Conversion Mode in overload conditions:

< 1 min. 110 %

Moment 118 %

If bypass inside voltage (< Rated output voltage +15 %):

After the delay (15 ms), UPS switches to bypass without output break\*.

Auto return to Double Conversion Mode without a break (Default) or Continue running in bypass

\*If input frequency is out of a synchronized range or constant frequency setting is selected, output break (less than 20 ms) may occur at switching to bypass.

The UPS may stay Bypass in overload conditions:

- < 30 sec. 200 %
- < 2 cycles 800 %

If bypass outside voltage:

After the delay (15 ms), Output is shutdown

2.3.7. Short circuit:

UPS is shutdown after 2 cycles at 800 % of nominal load.

2.3.8. Restart after short circuit:

Customer must turn On a MCCB switch.

2.3.9. Crest factor: 2.5:1

## 2.4. Battery Characteristics

2.4.1. Cold Start: The units cannot be started on battery.

2.4.2. Battery Replacement: Not hot Swappable

2.4.3. Battery Type:

12 V, 24W @ 15 min- rate (3U model)

12 V, 34W @ 15 min- rate (4U model)

2.4.4. Nominal Battery voltage:

192 V

2.4.5. Number of Batteries per Module:

16, in series.

2.4.6. Battery test: manual start (operate with LCD panel)

or automatic-start periodically (30, 90, 180 days)

It is able to do self battery check with PC interface or LAN interface.

Self battery check is also available from UPS management software or LAN interface card.

2.4.7. Battery Leakage Current:

No leakage current after end of backup time and full shutdown.

2.4.8. Battery Current Protection

Battery fuse 30 A\*

\*UL/CE certified UPS unit: 25 A

2.4.9. Battery protection against overvoltage:

Internal charger will stop if charger voltage exceeds 230 V (2.4 V / Cell).

2.4.10. Pre-alarm level / timings:

1.875 V / Cell

or according to battery remain time (2, 3, 5, 10 min.)

Pre-alarm level / timings are selectable also from UPS management software.

2.4.11. Battery to replace warning:

The UPS has inner timer. The battery service life always can be checked on LCD display.

The warning alarm sounds two times when the battery has reached its services life and before half a year.

2.4.12. Battery Supplier: CSB Battery

Part Number: HRL1223W (3U model) / HRL1234W (4U model)

2.4.13. Backup time:

Typical backup times tables:

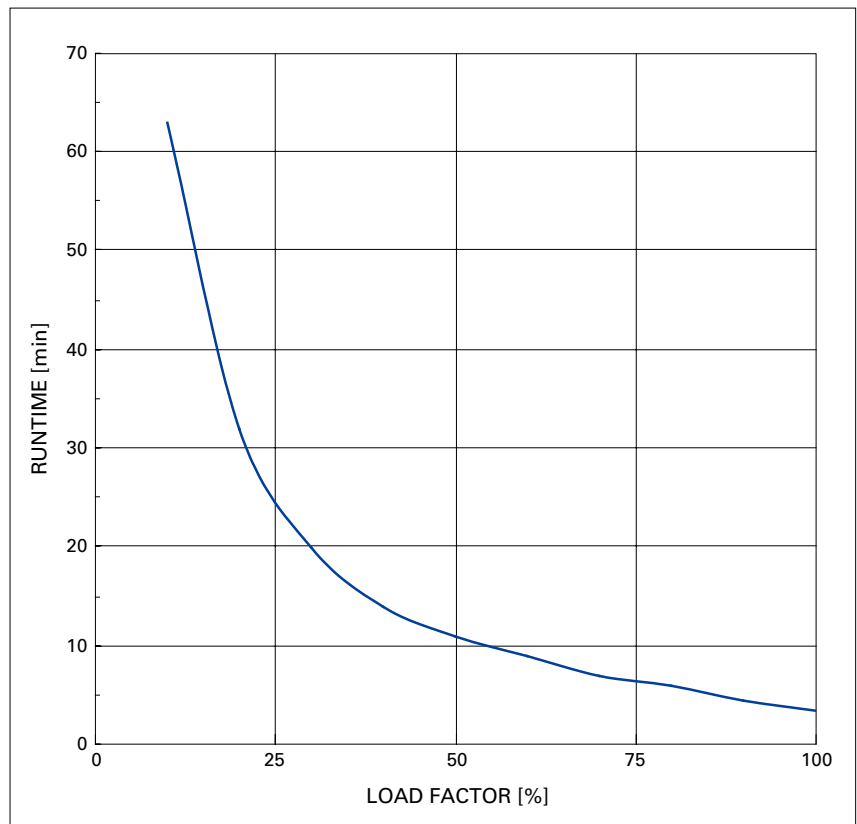
Backup times (in minutes) with 0.9 output power factor:

Batteries fully charged (at least 20 hours on floating conditions) @ 25 °C.

The battery aging is not taken into account in backup time prediction.

The batteries supplier is not taken into account.

	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
Std (min)	63	32	20	14	11	9	7	6	4.5	3.5



## 2.5. Charger Characteristics

2.5.1. Configuration: There is one charger per module.

2.5.2. The charger is powered by the DC bus.

2.5.3. Float:

The floating value is set to 218.4 V @ 25 °C.

2.5.4. Nominal charging current:

1.5 A with internal battery only

2.5 A with external batteries

2.5.5. Floating value table vs ambient room temperature:

T (°C)	0	10	20	30	40
Voltage / cell	2.316	2.299	2.275	2.25	2.219
Total voltage	222.3	220.7	218.4	216.0	213.0

2.5.6. Recharge time: 18 hours

(after 100% RCD load discharge then recharge to recover 100% of nominal backup time)

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## 3. Front Panel Information

### 3.1. LCD panel

1 LCD display on the top

4 LEDs on the top

INPUT (green) Turn On when the AC input is normal.

Blinking when the AC input is abnormal condition.

OUTPUT (green) Turn On when the output is supplied from inverter.

Blinking when the output is supplied from Bypass circuit.

BACKUP (green) Turn On when the inverter is operating with battery power.

Warning (red) Turn On when the UPS has caution/warning, malfunction or reached end of battery discharge.

5 buttons

(ON / OFF , ITEM , SELECT , BACK , HOME / BUZZER STOP)

#### 3.1.1. LCD Display

LCD Display on the LCD operational panel shows the following items:

STATUS Display the status of UPS.

MEASUREMENT Display the measurement values on UPS such as AC input voltage, Output voltage, battery voltage, etc.

MAINTENANCE Display the supporting date for maintenance of UPS such as operation log, event log, etc.

SETTING Display the setting items of UPS.

CONTROL Display the control item of UPS such as inverter On / Off, battery test, etc.

#### 3.1.2. ON / OFF button

##### 3.3.2.1 ON switch

Home menu control (select) → control INV ON (select) → INV ON

##### 3.3.2.2 OFF switch

Home menu control (select) → control INV OFF (select) → INV OFF



- 3.1.3. SELECT button  
Selects and accept LCD display items or contents.
- 3.1.4. ITEM button  
Switches LCD display items or contents.
- 3.1.5. BACK button  
Cancels the selection and returns to previous LCD display (menu) level.
- 3.1.6. HOME / BUZZER STOP button  
Returns the LCD display (menu) level to the home menu.  
When the buzzer is sounding, stops the buzzer.

### 3.2. UPS Unit Control Panel

- 1 Main breaker
- 1 button (ON/OFF)
- 3 LEDs
  - INPUT (green) Turn On when the AC input is normal.  
Blinking when the AC input is abnormal condition.
  - OUTPUT (green) Turn On when the output is supplied from inverter.  
Blinking when the output is supplied from Bypass circuit.
  - Alarm (red) Turn On there is a malfunction or the battery is exhausted.

#### 3.2.1. Main breaker

Turns ON/OFF the UPS input power and provides protection.  
Protects the internal bypass circuits.

#### 3.2.2. ON/OFF button

##### 3.2.2.1. ON switch

Push time > 1 second: start the inverter

##### 3.2.2.2. OFF switch


Push time > 3 seconds\*: stop the inverter of switch pushed unit

\* User can select how to turn off from (1 second, 3 seconds or unique).

### 3.3. BUZZER Sounds

ITEMS	ALARM LED	Warning LED	Buzzer Sound
Fatal unit failure	Lit	Lit	Sound 1
Over load		Blink	Sound 2
AC input abnormal			Sound 3
Battery voltage low		Blink	Sound 4
Battery termination voltage	Lit	Lit	Sound 1

Sound 1:

 Continuous tone: \*-----


The buzzer must beep continuously when:  
The UPS has a mechanical failure.  
The battery is exhausted.

Sound 2:


 Beep four times in 3 seconds: \*\*\*\* \* 3 \*\*\*\* ...

The load devices connected to the output exceed the rated capacity.

Sound 3:

 Beep two time in 2 seconds: \*\* \*\* \* \* \* \* ...  
Input Voltage failed.

Sound 4:

 Continuous beep: \*\*\*\*\* ...  
On battery, when the UPS reaches the pre-alarm threshold of battery voltage low.

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## 4. Communication links specification

### 4.1. RS232 communication (on DB9 connector)

### 4.2. EPO and Remote ON / OFF terminal block

### 4.3. Dry Contact Signal

It provides status in the form of 6 Alarm relays (100 VAC / 50 VDC, 0.1 A).  
Connection provided is D-Sub 15pin connector.

### 4.4. Optional Card slots

1 slot is available. Below is a list of optional cards.

4.4.1. LAN interface Card (PRE11A01-US, PRLANIF001) features a web interface, Simple Network Management Protocol (SNMP), Simple Mail Transfer Protocol (SMTP) email notification and keeps log files about UPS operation.

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## 5. Parallel Operation

### 5.1. Parallel type configurations

#### 5.1.1. "N+1 Redundancy"

An additional UPS unit (+1) is required to keep running and backup under fault condition of one UPS. This is known as "N+1 Redundancy" within the UPS system. A11J can backup up to 15kVA load with four UPS units as N+1 redundancy.

## **5.2. Parallel Communications**

- 5.2.1. Parallel communications between UPS units is completed through "Half duplex serial" communication process with multi-master bus network. Communication cables are supplied with each UPS for hardwire connections. (RJ45 type)

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## **6. Standards**

### **6.1. Safety**

- UL Listed (UL1778 4th edition)
- CE Marking (IEC62040-1-1)

### **6.2. EMC**

- FCC Part 15 Subpart B.

### **6.3. Susceptibility**

- IEC 61000-4-2 (ESD): level 4.
- IEC 61000-4-5 (Surge): level 4.

### **6.4. Transportation**

- JIS Z 0200 (drop and vibration tests)

### **6.5. Environment temperature and humidity**

- 6.5.1. Ambient operating temperature: 0 to 40 °C (32 to 104 °F)
- 6.5.2. Ambient storage temperature: -15 to 50 °C (5 to 122 °F)
- 6.5.3. Humidity: 30 to 90 %.
- 6.5.4. Altitude: up to 2000 meters (6000 ft.) without derating.

### **6.6. Audible noise**

- 5 kVA: Max 45 dBA online (buzzer not included)
- 10 to 20 kVA: Max 50 dBA online (buzzer not included)

### **6.7. MTBF**

- 5 kVA (Single): 2,870,000 hours (est.)
- 5 to 20 kVA (Parallel: N): 1,410,000 hours (est.)
- 5 to 20 kVA (Parallel: N+1): 1,840,000 hours (est.)

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