

SANUPS

ASE-H Series 208V

1~5kVA

Parallel Redundant Uninterruptible Power Systems

Technical Specification

May '07

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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. Expandability up to five units at a maximum enables to provide the output capacity of 5 kVA. 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 % rated, automatic, continuous duty static switch.

2. UPS Requirements and Performance Characteristics

2.1. Rating

- 2.1.1. The UPS is available in:

Number of units	2	3	4	5
Apparent power	7 kVA	10.5 kVA	10.5 kVA	14 kVA
Active power @ 0~40 °C	1.4 kW	2.1 kW	2.8 kW	3.5 kW

N+1 parallel redundant operation

Number of units	2	3	4	5
Apparent power	1 kVA	2 kVA	3 kVA	4 kVA
Active power @ 0~40 °C	0.7 kW	1.4 kW	2.1 kW	2.8 kW

2.2. Input Features

- 2.2.1. Voltages: 208 V, 1 phase, 2 wire + ground
- 2.2.2. ON LINE AC input Range:
176.8 to 239.2 V (+/- 15 %)
- 2.2.3. Input Frequency: 50 / 60 Hz Auto-select.
50 Hz (Default)
- 2.2.4. Input Frequency Range: +/- 1, 3, 5 % (User selectable) +/- 3 % (Default)

2.2.5. Current Values

Output capacity / 1 kVA

	Sn (kVA)	Normal AC source (A)	Load (A)
Double Conversion: Min i/p voltage (176.8 V) and 208 V o/p	1	4.5	4.8
On Bypass and 176.8 V i/p voltage	1	5.7	5.7

Output capacity / 2 kVA

	Sn (kVA)	Normal AC source (A)	Load (A)
Double Conversion: Min i/p voltage (176.8 V) and 208 V o/p	2	9.0	9.6
On Bypass and 176.8 V i/p voltage	2	11.3	11.3

Output capacity / 3 kVA

	Sn (kVA)	Normal AC source (A)	Load (A)
Double Conversion: Min i/p voltage (176.8 V) and 208 V o/p	3	13.5	14.4
On Bypass and 176.8 V i/p voltage	3	17.0	17.0

Output capacity / 4 kVA

	Sn (kVA)	Normal AC source (A)	Load (A)
Double Conversion: Min i/p voltage (176.8 V) and 208 V o/p	4	18.0	19.2
On Bypass and 176.8 V i/p voltage	4	22.6	22.6

Output capacity / 5 kVA

	Sn (kVA)	Normal AC source (A)	Load (A)
Double Conversion: Min i/p voltage (176.8 V) and 208 V o/p	5	22.5	24.0
On Bypass and 176.8 V i/p voltage	5	28.3	28.3

2.2.6. Recommended AC input Fuse: 8 A (each unit)

2.2.7. Inrush Current: 17 A for 1 mss

2.2.8. Input Current Total Harmonic Distortion: < 10 %

2.2.9. Power factor: > 0.7

2.3. Output Characteristics

2.3.1. Voltages: 208 V Single phase

2.3.2. Voltage Regulation: +/- 5 %

2.3.3. Frequency: Auto-select 50 / 60 Hz (60 Hz by default).

- 2.3.4. Frequency Regulation:
 - +/- 1, 3, 5 % (User selectable)
 - +/- 5 % (Default): Double Conversion Mode
 - +/- 0.5 %: Battery Operation
- 2.3.5. Frequency converter mode: Can not be used as a frequency converter
- 2.3.6. Frequency Stability:
 - When UPS is synchronized on Normal AC source, the max phase shift is 31 μ s, and inverter phase leads Normal AC phase.
- 2.3.7. Overload detection: Current limited
 - Overload occurs when output ampere is beyond 105 % of nominal load. The 1 kVA meets overload detection as soon as measured output VA is beyond 1.05 kVA.
 - The UPS may stay Double Conversion Mode in overload conditions:
 - <200 ms 105%
 - If bypass inside voltage (< 144 V):
 - After the delay (200 ms), UPS switches to bypass without output break. Auto return to Double Conversion Mode without a break
- 2.3.8. Short circuit:
 - 800 % of nominal load during 2 cycles
- 2.3.9. Restart after short circuit:
 - Customer must change a bypass fuse after turning off a MAIN SW.
- 2.3.10. Crest factor: 2.5:1

2.4. Battery Characteristics

- 2.4.1. Cold Start: The units can be started on battery.
- 2.4.2. Battery Replacement: Hot Swappable
- 2.4.3. Battery Type: 12 Volts / 7 Ah
- 2.4.4. Nominal Battery voltage: 36 V
- 2.4.5. Number of Batteries per Module: 3, in series.
- 2.4.6. Battery test: manual start
 - It is able to do self battery check with PC interface.
- 2.4.7. Leakage Current:
 - 100 μ A after end of backup time and full shutdown if DC circuit is on.
- 2.4.8. Battery Current Protection: Battery fuse 40 A
- 2.4.9. Battery protection against overvoltage :
 - Yes, if charger voltage exceeds 49.5 V (2.75 V / Cell).
- 2.4.10. Pre-alarm level: By default, set to 1.8 Volts / Cell.
- 2.4.11. Battery to replace warning:
 - The UPS does not have the warning alarm for a battery replacement.

2.4.12. Battery Supplier: Shin-Kobe Electric Machinery

Part Number: = HF7-12

2.4.13. Backup time

Typical backup times tables

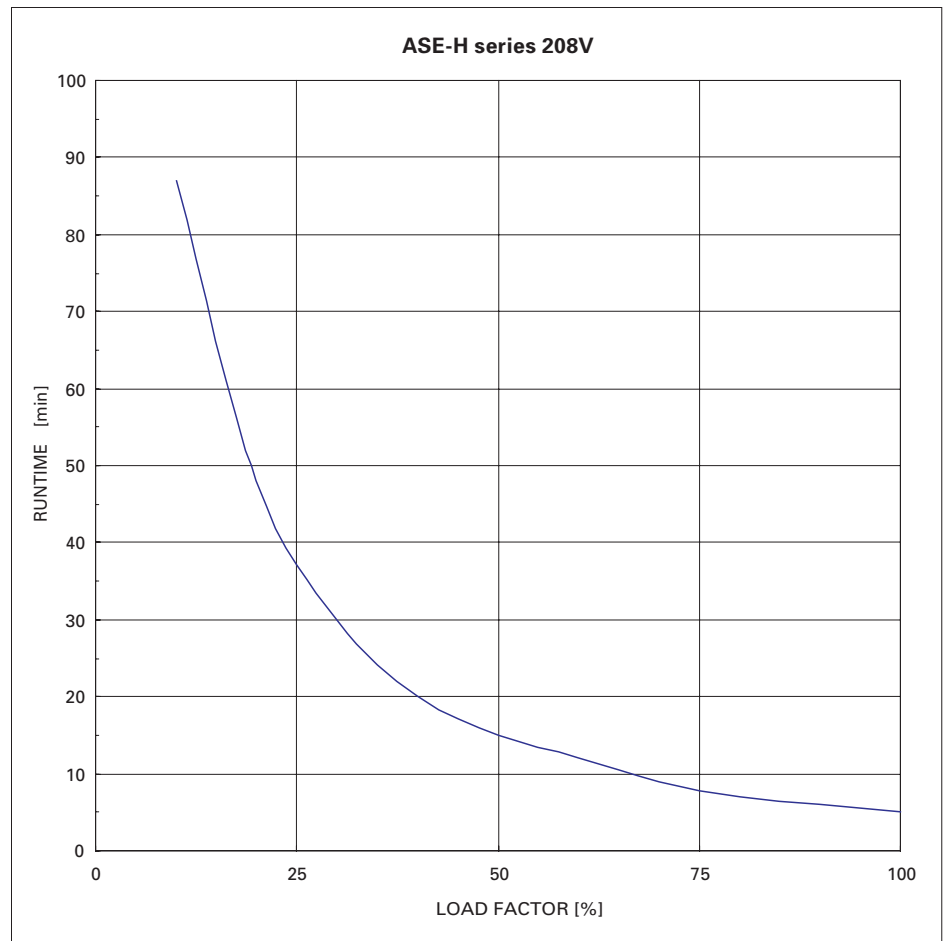
Backup times (in minutes) with 0.7 output power factor:

Batteries fully charged (at least 12 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)	87	48	30	20	15	12	9	7	6	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 41.0 V @ 25 °C.
- 2.5.4. Nominal charging current: 0.5 A
- 2.5.5. Floating value table vs ambient room temperature:

T (°C)	0	10	20	25	30	40
Voltage / cell	2.317	2.30	2.28	2.275	2.267	2.25
Total voltage	41.7	41.4	41.0	40.95	40.81	40.5

- 2.5.6. Recharge time: 12 hours
(after 100 % RCD load discharge then recharge to recover 90 % of nominal backup time)

3. Front Panel Information

3.1. MIMIC panel

13 LEDs on the top

INV.ON STAND BY (green)

INPUT (green)

OUTPUT (green)

P.R.O.* (green)

F.T.* (green)

BATT. LOW (red)

LOAD LEVEL : 25 %, 50 %, 75 %, 100 % (green) / O.L. (red)

ALARM (red)

BATT. TEST (green)

*P.R.O.: Parallel Redundant Operation

F.T.: Fault Tolerant

3 buttons (INV.ON STAND BY / CLEAR / BATT.TEST)

3.2. INV.ON / STAND BY button.

3.2.1. ON switch

Push time > 1 second: start the inverter

Push time > 6 seconds: UPS cold start (if batteries connected and without Normal AC source)

3.2.2. OFF switch

Push time > 1 second: stop the inverter

3.3. Battery Test button

The UPS starts a battery test when this button has been pushed.

If the button is pushed again during battery test, the UPS stops a battery test.

3.4. Clear button

Clear the result of battery test.

And if the button is pushed during alarm beeping, the UPS stops alarm beeping.

4. Communication links specification

4.1. RS232 communication (on DB9 connector)

4.2. Optional Card slots:

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

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

4.2.2. Contact Signal Interface Card (PRASE06) provides status in the form of 5 Alarm relays (125V 0.5A rated relays). Connection provided is D-Sub 15pin connector.

5. Parallel Operation

5.1. Parallel type configurations have (2) two distinct characteristics.

5.1.1. "Load Sharing Redundancy" Whereas two UPS units equally share the load (50%/50%). Under this condition the UPS's will be backing up one another in the case where one UPS has a fault condition. This is known as "Redundancy" within the UPS System. (Load can not exceeded 100% of one UPS unit).

5.1.2. "N+1 Redundancy" Whereas two UPS units equally share the load (50%/50%). An additional UPS (+1) is required as a backup for either UPS under a fault condition. This is known as "N+1 Redundancy" within the UPS system. One UPS (N+1) can backup up to 4kVA load.

5.2. Parallel Communications

- 5.2.1. Parallel communications between UPS units is completed through "Unique" communication process. This process is similar to a "Token Ring Bus" whereas if one communication cable has a fault condition the communication will reverse itself automatically to communicate with each UPS unit. Communication cables are supplied with each UPS for hardwire connections. (DB15 type)

6. LEDs and buzzer

6.1. BUZZER DEFINITION

Definition:

- Beep two times in 2 seconds: ** ** * * * * ...
As soon as the UPS is on battery it must beep slow.
- One beep: *
Key clicked at a setup menu.
- One beep (melodious trill): *
An inverter is on or off.
- Beeps two times: **
Reached at a setup menu.
- Continuous beeps: *****...
On battery, when the UPS reaches the pre-alarm threshold it must beep quick.
- Continuous tone: *-----
The buzzer must beep continuously when:
The UPS has a mechanical failure.The battery is exhausted.
- Beep four times in 3 seconds: **** * * * * ...
The load devices connected to the output exceed the rated capacity.
- One beep in 2 seconds: * * ...
P.R.O. error: There is one of the following setting errors.
 - a. If the "Number of units" setting is not the same in all UPS Units in the same UPS system.
 - b. If the "Number of units" setting does not match the actual number of UPS units.
 - c. If the Unit Interface Cables are not connected correctly.

Customer can change the power outage beeper setting.

- a. Beep
- b. No beep

Note that:

In any case, it is possible to stop the buzzer at any time, until the next buzzer, by pressing CLEAR button.

7. Standards

7.1. Safety:

The UPS meet UL1778 stds.It is UL listed.

7.2. EMC:

UPS are class A according to FCC Part 15 Subpart B.

7.3. Susceptibility:

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

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

7.4. Transportation:

JIS Z 0200 (drop and vibration tests) : Yes.

7.5. Environment temperature and humidity

7.5.1. Ambient operating temperature: 0 to 40°C (32 to 104°F)

7.5.2. Ambient storage temperature: -15 to 50°C (5 to 122°F)

7.5.3. Humidity: 30 to 90 %.

7.5.4. Altitude: up to 2000 meters (6000 ft.) without derating.

7.6. Audible noise

1~2kVA: Max 40 dBA online (buzzer not included)

3~5kVA: Max 45 dBA online (buzzer not included)

7.7. MTBF

120,000 hours (est.)

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