

## UL TEST REPORT AND PROCEDURE

<b>Standard:</b>	UL 60950-1, 2nd Edition, 2007-03-27 (Information Technology Equipment - Safety - Part 1: General Requirements) CSA C22.2 No. 60950-1-07, 2nd Edition, 2007-03 (Information Technology Equipment - Safety - Part 1: General Requirements)
<b>Certification Type:</b>	Component Recognition
<b>CCN:</b>	QQGQ2, QQGQ8 (Power Supplies for Information Technology Equipment Including Electrical Business Equipment)
<b>Product:</b>	Switching Power Supply for building -in
<b>Model:</b>	Model HWS1000L-X /YYYYYYYY, SWS1000L-X /YYYYYYYY, where X can be 3, 5, 12, 15, 24, 36, 48, or 60. And, /YYYYYYYY can be /RF, /RFHC, /RFCO2, /HC, /HCCO2, /CO2, /RFHCCO2, /LLF, /LLFCO2 or blank.
<b>Rating:</b>	Model HWS1000L-X /BATz, where X can be 36 or 60. And, z can be 3 digit max which consist of 0 to 9 and/or A to Z or blank. Input: 100-240 Vac, 13A, 50/60 Hz.  Output: HWS1000L-3, SWS1000L-3, +3.3Vdc, 200A; HWS1000L-5, SWS1000L-5, +5 Vdc, 200A; HWS1000L-12, SWS1000L-12, +12 Vdc, 88A; HWS1000L-15, SWS1000L-15, +15Vdc, 70A; HWS1000L-24, SWS1000L-24, +24 Vdc, 44A; HWS1000L-36, SWS1000L-36, +36 Vdc, 29A; HWS1000L-48, SWS1000L-48, +48 Vdc, 22A; HWS1000L-60, SWS1000L-60, +60 Vdc, 17A;
<b>Applicant Name and Address:</b>	TDK-LAMBDA SINGAPORE PTE LTD #06-01/08 1008 TOA PAYOH NORTH SINGAPORE 318996 SINGAPORE

This is to certify that representative samples of the products covered by this Test Report have been investigated in accordance with the above referenced Standards. The products have been found to comply with the requirements covering the category and the products are judged to be eligible for Follow-Up Service under the indicated Test Procedure. The manufacturer is authorized to use the UL Mark on such products which comply with this Test Report and any other applicable requirements of UL LLC ('UL') in accordance with the Follow-Up Service Agreement. Only those products which properly bear the UL Mark are considered as being covered by UL's Follow-Up Service under the indicated Test Procedure.

The applicant is authorized to reproduce the referenced Test Report provided it is reproduced in its entirety.

UL authorizes the applicant to reproduce the latest pages of the referenced Test Report consisting of the first page of the Specific Technical Criteria through to the end of the Conditions of Acceptability.

Any information and documentation involving UL Mark services are provided on behalf of UL LLC (UL) or any authorized licensee of UL.

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Reviewed by: CheeBeng Wai

**Supporting Documentation**

The following documents located at the beginning of this Procedure supplement the requirements of this Test Report:

- A. Authorization - The Authorization page may include additional Factory Identification Code markings.
- B. Generic Inspection Instructions -
  - i. Part AC details important information which may be applicable to products covered by this Procedure. Products described in this Test Report must comply with any applicable items listed unless otherwise stated in the body of this Test Report.
  - ii. Part AE details any requirements which may be applicable to all products covered by this Procedure. Products described in this Test Report must comply with any applicable items listed unless otherwise stated in the body of each Test Report.
  - iii. Part AF details the requirements for the UL Certification Mark which is not controlled by the technical standard used to investigate these products. Products are permitted to bear only the Certification Mark(s) corresponding to the countries for which it is certified, as indicated in each Test Report.

### Product Description

- Electronic components mounted on PWB and housed with metal enclosure;
- Provided with 2 fans operating in variable speed, which is related to ambient temperature for normal fan mode;
- Provided with 2 fans operating in fixed speed, which is independent of ambient temperature for reverse fan mode;

### Model Differences

All Models are similar to each other, except the following:-

- Output rating; +3.3Vdc for SWS1000L-3; +5Vdc for SWS1000L-5; +12Vdc for SWSL1000L-12; +15Vdc for SWS1000L-15; +24Vdc for SWS1000L-24; +36Vdc for SWS1000L-36; +48Vdc for SWS1000L-48; +60Vdc for SWS1000L-60;
- Layout;
- Transformer (T2) secondary winding;
- Model designation (refer to Additional information more designation information);

Model HWS1000L-X /YYYYYYY is identical to model SWS1000L-X /YYYYYYY except for the designation, where X can be 3, 5, 12, 15, 24, 36, 48, or 60. And, /YYYYYYY can be /RF, /RFHC, /RFCO2, /HC, /HCCO2, /CO2, /RFHCCO2, /LLF, /LLFCO2 or blank.

Model HWS1000L-36 /BATz and HWS1000L-60 /BATz are identical to basic model except for the designation, OCP range from 55%~100% of rated current and PCB maybe additionally coated (not evaluated to clause 2.10.6.2 - Coated Printed Boards). The OCP adjustment can only be adjusted by TDK-Lambda appointed service person when installation into end product. (z = 3 digit max which consist of 0 to 9 and/or A to Z or blank for marketing purpose). Additional evaluation may be required during end product testing.

### Technical Considerations

- Equipment mobility : for building-in
- Connection to the mains : for building-in
- Operating condition : continuous
- Access location : operator accessible
- Over voltage category (OVC) : OVC II
- Mains supply tolerance (%) or absolute mains supply values : +10%, -10%
- Tested for IT power systems : No
- IT testing, phase-phase voltage (V) : NA
- Class of equipment : Class I (earthed)
- Considered current rating (A) : 20
- Pollution degree (PD) : PD 2
- IP protection class : IP X0
- Altitude of operation (m) : Up to 2000
- Altitude of test laboratory (m) : Up to 2000
- Mass of equipment (kg) : < 18 (2.3kg)
- The product was submitted and evaluated for use at the maximum ambient temperature (Tma) permitted by the manufacturer's specification of: Tma for Power Supply with Normal Fan Mode configuration is 50°C; while Tma for Power Supply with Reverse Fan Mode configuration is 35°C.

- The product is intended for use on the following power systems: TN
- The following are available from the Applicant upon request: Installation (Safety) Instructions / Manual

#### **Engineering Conditions of Acceptability**

For use only in or with complete equipment where the acceptability of the combination is determined by UL LLC. When installed in an end-product, consideration must be given to the following:

- The following Production-Line tests are conducted for this product: Earthing Continuity, Electric Strength
- The end-product Electric Strength Test is to be based upon a maximum working voltage of: Primary-Earthed Dead Metal: 234 Vrms, 333Vpk, Primary-SELV: 412.8 Vrms, 551.8 Vpk
- The following secondary output circuits are SELV: +3.3Vdc for SWS1000L-3; +5Vdc for SWS1000L-5; +12Vdc for SWSL1000L-12; +15Vdc for SWS1000L-15; +24Vdc for SWS1000L-24; +36Vdc for SWS1000L-36; +48Vdc for SWS1000L-48; +60Vdc for SWS1000L-60.
- The following secondary output circuits are at hazardous energy levels: +3.3Vdc for SWS1000L-3; +5Vdc for SWS1000L-5; +12Vdc for SWSL1000L-12; +15Vdc for SWS1000L-15; +24Vdc for SWS1000L-24; +36Vdc for SWS1000L-36; +48Vdc for SWS1000L-48; +60Vdc for SWS1000L-60.
- The following output terminals were referenced to earth during performance testing: Transformer T2 (pin 11, 13, 14) and T4 (pin 1, pin 4)
- The power supply terminals and/or connectors are: Suitable for factory wiring only, Not investigated for field wiring
- The maximum investigated branch circuit rating is: 20 A
- The investigated Pollution Degree is: 2
- Proper bonding to the end-product main protective earthing termination is: Required
- An investigation of the protective bonding terminals has: Been conducted
- The following input terminals/connectors must be connected to the end-product supply neutral: Terminal Block TB1 (pin3)
- The following magnetic devices (e.g. transformers or inductor) are provided with an OBJY2 insulation system with the indicated rating greater than Class A (105°C): Transformer T2 (Class F), Transformer T4 (Class B or Class F), Transformer T3 (Class A).
- The following end-product enclosures are required: Mechanical, Fire, Electrical
- The maximum continuous power supply output (Watts) relied on forced air cooling from: 1300 W fan (B1 and B2) at 27.5 cfm applied to rear end power supply.
- Terminal Block (TB1) was not evaluated as terminal block for direct connecting of power supply , cord.
- Normal FAN mode configuration is evaluated at ambient of upto 50degC at 100% loading condition declared by manufacturer.
- Reverse FAN mode configuration is evaluated at ambient of upto 35degC at 100% loading condition declared by manufacturer.

#### **Additional Information**

- SWS1000L-X /YYYYYYYY, where X can be 3, 5, 12, 15, 24, 36, 48, or 60. And, /YYYYYYYY can be /RF, /RFHC, /RFCO2, /HC, /HCCO2, /CO2, /RFHCCO2, /LLF, /LLFCO2 or blank.

-Model HWS1000L-X /BATz, where X can be 36 or 60. And, z can be 3 digit max which consist of 0 to 9 and/or A to Z or blank.

- 1) /RF: Reverse Fan
- 2) /HC: Hiccup mode
- 3) /CO2: Carbon coating
- 4) /LLF: Long Life Fan
- 5) /BATz: OCP setting can be adjusted from 55% to 100%.
- 6) /LLFCO2: Long Life Fan and Carbon coating

- Power supply is evaluated at 100% loading (declared by manufacturer) at ambient up to and including 50degC for normal fan mode.


- Power supply is evaluated at 100% loading (declared by manufacturer) at ambient up to and including 35degC for reverse fan mode.

- The OCP setting of all models (except /BATz) may be adjusted from 30%~100% of the rated current and PCB may be additionally coated which is not evaluated to clause 2.10.6.2 - Coated Printed Boards. The OCP adjustment can only be adjusted by factory. (z = 3 digit max which consist of 0 to 9 and/or A to Z or blank for marketing purpose). Additional evaluation may be required during end product testing.

**Additional Standards**

The product fulfills the requirements of: N/A

**Markings and instructions**

Clause Title	Marking or Instruction Details
Power rating - Ratings	Ratings (voltage, frequency/dc, current)
Power rating - Company identification	Listee's or Recognized company's name, Trade Name, Trademark or File Number
Fuses - Rating	Rated current and voltage and type located on or adjacent to fuse or fuseholder.
Terminals for external primary power supply conductors	Capital letter "N" located adjacent to a terminal intended exclusively for connection of the primary power neutral conductor
Marking of hot parts	Parts inside the equipment that are hot and may be touched are marked with  (60417-2-IEC-5041) adjacent to the part.

**Special Instructions to UL Representative**

1. Inspect the transformer(s) listed in BD1.1 per AA1.1-(C). When the tests are conducted at other location, inspect test record and specification sheet provided by the component manufacturer. Verify the specification sheet indicates 100% routine test specified in BD1.1 be conducted at the component manufacturer.

2. The manufacturer ALPS LOGISTICS FACILITIES CO LTD (Sub. #100553-903) will receive complete

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assembled power supply shipped from other manufacturers within the Volume (Vol. X2) and conduct the following customization, at ALPS LOGISTICS FACILITIES CO LTD:-

- (a) To modify Over Current Protection setting to be lower from 110% or below of rated output current of all power supply models described in this report by adjusting VR1.
- (b) The hole of adjusted VR1 on chassis to be covered by label after the adjustment.
- (c) The modified power supply models will be marked with Factory ID "F" on the product or smallest unit container in which is packed.