UL TEST REPORT AND PROCEDURE

Standard:	UL 60950-1, 2nd Edition, 2014-10-14 (Information Technology Equipment - Safety - Part 1: General Requirements) CAN/CSA C22.2 No. 60950-1-07, 2nd Edition, 2014-10 (Information Technology Equipment - Safety - Part 1: General Requirements)
Certification Type:	Component Recognition
CCN:	QQGQ2, QQGQ8 (Power Supplies for Information Technology Equipment Including Electrical Business Equipment)
Complementary CCN:	QQJQ2, QQJQ8 (Power Supplies for Use in Audio/Video, Information and Communication Technology Equipment)
Product:	Switching power supply
Model:	RWS1000B-12, RWS1000B-15, RWS1000B-24, RWS1000B-36, RWS1000B-48 Maybe followed by suffix "abcde" a is /, b is R or S, c is CO2, d is FO, e is RF and "a", "b", "c", "d" and "e" may be blank)
Rating:	100-240 Vac, 50-60 Hz, 13.0 A
Applicant Name and Address:	TDK-LAMBDA CORP NAGAOKA TECHNICAL CENTER R&D DIV 2704-1 SETTAYA-MACHI NAGAOKA-SHI NIIGATA 940-1195 JAPAN

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.

Prepared by: Nao Maede Reviewed by: Tetsuo Iwasaki

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

The product covered in this Test Report is building-in type switching power supply with a single output circuit.

Output:
12 Vdc (10.2 Vdc - 13.8 Vdc), maximum 84 A (maximum 1008 W) (for RWS1000B-12)
15 Vdc (12.75 Vdc - 17.25 Vdc), maximum 67 A (maximum 1005 W) (for RWS1000B-15)
24 Vdc (20.4 Vdc - 28.8 Vdc), maximum 42 A (maximum 1008 W) (for RWS1000B-24)
36 Vdc (30.6 Vdc - 41.4 Vdc), maximum 28 A (maximum 1008 W) (for RWS1000B-36)
48 Vdc (40.8 Vdc - 57.6 Vdc), maximum 21 A (maximum 1008 W) (for RWS1000B-48)
AUX output: 5 Vdc, 1 A

Model Differences

Each model is identical, except for model designation, output rating, secondary winding and internal construction of Transformer (T3), and secondary components.

RWS1000B Series maybe followed by suffix "abcde" (a is /, b is R or S, c is CO2, d is FO, e is RF; and "a", "b", "c", "d" and "e" may be blank)
1. S: Model with AUX output and ON/OFF control function.
2. R: Model with optional ON/OFF control function.
3. CO2: Model with optional thin coating (QMJU2) on both sides of PWB.
4. FO: Model with Remote Sensing, Parallel operation, Low output voltage alarm.
5. RF: Model with opposite direction and air flow of Fan and different Output Derating Curve.

Technical Considerations

- Equipment mobility : for building-in
- Connection to the mains : N/A
- Operating condition : continuous
- Access location : N/A (for building-in)
- Over voltage category (OVC) : OVC II
- Mains supply tolerance (%) or absolute mains supply values : +10%, -10%
- Tested for IT power systems : Yes
- IT testing, phase-phase voltage (V) : 230 V

- Class of equipment : Class I (earthed)
- Considered current rating of protective device as part of the building installation (A) : 20 A
- Pollution degree (PD) : PD 2
- IP protection class : IP X0
- Altitude of operation (m) : Up to 5000 m
- Altitude of test laboratory (m) : approximately 10 to 20 m
- Mass of equipment (kg) : 1.9
- The product was submitted and evaluated for use at the maximum ambient temperature (Tma) permitted by the manufacturer's specification of: See Enclosure #7-01 and 7-04.
- The product is intended for use on the following power systems: IT, TN

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 end-product Electric Strength Test is to be based upon a maximum working voltage of: Model RWS1000B-12: Primary-SELV: 240 Vrms, 446 Vpk, Primary-Earthed Dead Metal: 240 Vrms, 408 Vpk, , Model RWS1000B-15: Primary-SELV: 240 Vrms, 446 Vpk, Primary-Earthed Dead Metal: 240 Vrms, 400 Vpk, , Model RWS1000B-24: Primary-SELV: 250 Vrms, 464 Vpk, Primary-Earthed Dead Metal: 240 Vrms, 404 Vpk, , Model RWS1000B-36: Primary-SELV: 255 Vrms, 496 Vpk, Primary-Earthed Dead Metal: 240 Vrms, 404 Vpk, , Model RWS1000B-48: Primary-SELV: 286 Vrms, 588 Vpk, Primary-Earthed Dead Metal: 240 Vrms, 422 Vpk, , Suffix S model: Primary-SELV: 379 Vrms, 560 Vpk, Primary-Earthed Dead Metal: 383 Vrms, 588 Vpk
- The following secondary output circuits are SELV: Output of all models
- The following secondary output circuits are at hazardous energy levels: Output of Models RWS1000B-12, RWS1000B-15, RWS1000B-24, RWS1000B-36, RWS1000B-48
- The following secondary output circuits are at non-hazardous energy levels: AUX output (Suffix "/S" Model),
- The following secondary output circuits are supplied by a Limited Power Source: AUX output (Suffix "/S" Model),
- The power supply terminals and/or connectors are: Suitable for factory wiring only
- 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: Not been conducted
- 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 T1 (Class 130 (B)), Transformer (T2) (Class 130 (B)), Transformer (T3) (Class 155 (F)), Transformer (T401) (Class 155 (F) for Type A27450x, Class 130 (B) for Type A27452x)
- The following end-product enclosures are required: Mechanical, Electrical, Fire
- Line to Line Capacitor C1 has maximum 3.3 uF for capacitance and C2 has maximum 1.0 uF for capacitance. C1: 3.3 uF and C2: 1.0 uF were used in test. Therefore, consideration shall be given to conducting Capacitance Discharge Test in the end-product with respect to the variation in C1 and C2.
- Line to ground Capacitors C3, C4, C5 and C6 has maximum 1500pF for capacitance. Primary to ground Capacitors C15, C20 has maximum 2200pF for capacitance. Secondary to ground capacitors

C51, C52 has maximum 1000pF for capacitance, C60 have maximum 0.022uF for capacitance and C61 have maximum 0.01uF for capacitance. C3, C4, C5, C6: 1500pF, C15, C20: 2200pF, C51, C52:1000pF, C60: 0.022uF and C61 0.01uF were used in test. Therefore, consideration shall be given in conducting Touch Current Test in the end product application with respect to the variation in C3, C4, C5, C6, C15, C20, C51, C52, C60 and C61.

- The following output circuits are at ES1 energy levels : Output of all models
- The following output circuits are at PS3 energy levels : Output of Models RWS1000B-12, RWS1000B-15, RWS1000B-24, RWS1000B-36, RWS1000B-48
- Humidity conditioning has been conducted by tropical condition.
- Classification of PIS has not been conducted. Therefore, all electrical components and conductors including printed wirings were assumed to be arcing/resistive PIS.
- This component has been evaluated in ‘control of fire spread’ method assuming appropriate fire enclosure is provided in end product. Unless the fire enclosure is made of non-combustible or V-0 material, the separation from the PIS shall be considered.

Additional Information

The Clearances and Creepage Distances have additionally been assessed for suitability up to 5000 m elevation.

Additional Standards

The product fulfills the requirements of: The product fulfills the requirements of: UL 62368-1, 2nd Edition, 2014-12-01, CAN/CSA C22.2 No. 62368-1-14, 2nd Edition, 2014-12.

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
Power rating - Model	Model Number
Fuses - Rating	Rated current and voltage and type located on or adjacent to fuse or fuseholder.