

## UL TEST REPORT AND PROCEDURE

|                                    |   |
|------------------------------------|---|
| <b>Standard:</b>                   | UL 60950-1, 2nd Edition, 2019-05-09 (Information Technology Equipment - Safety - Part 1: General Requirements)<br>CAN/CSA C22.2 No. 60950-1-07, 2nd Edition, 2014-10 (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>Complementary CCN:</b>          | QQJQ2, QQJQ8 (Power Supplies for Use in Audio/Video, Information and Communication Technology Equipment)  |
| <b>Product:</b>                    | AC-DC Power Supply  |
| <b>Model:</b>                      | KWS5A-5, KWS5A-12, KWS5A-15, KWS5A-24.<br>KWS10A-5, KWS10A-12, KWS10A-15, KWS10A-24.  |
| <b>Rating:</b>                     | Input:<br>100-240 V, AC 50-60 Hz, 0.13 A (KWS5A series)<br>100-240 V, AC 50-60 Hz, 0.25 A (KWS10A series)<br><br>Output: See Additional Information.  |
| <b>Applicant Name and Address:</b> | TDK-LAMBDA CORP<br>NAGAOKA TECHNICAL CENTER<br>R&D DIV<br>2704-1 SETTAYA-MACHI<br>NAGAOKA-SHI<br>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: Tetsuo Iwasaki / Project Handler      Reviewed By: Masatomo Takiyama / Reviewer

**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 unit is building-in component, module type switching power supply filled with insulating compound.

Output ratings, see Additional Information.

**Model Differences**

<Model Differences between each models in KWS5A series and in KWS10A series >

All models are identical except output ratings, Transformer (T1), and rating of some minor components.

<Differences between KWS5A series and KWS10A series>

KWS5A series and KWS10A series are identical in construction except capacitance of C2, Diode of secondary side (and associated pattern trace), and resistance of R101, R105, R106 (minor component).

**Test Item Particulars**

|   |                  |
|---|------------------|
| Mass of equipment (kg)  | 35 g             |
| Equipment mobility  | for building-in  |
| Connection to the mains   | N/A              |
| Operating condition   | continuous       |
| Access location   | for building-in  |
| 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)   | N/A              |
| Class of equipment  | Not classified   |
| Considered current rating of protective device as part of the building installation (A) | 20 A             |
| Pollution degree (PD)   | 2                |
| IP protection class   | IP X0            |
| Altitude of operation (m)   | Up to 3000 m     |
| Altitude of test laboratory (m)   | less than 2000 m |

**Technical Considerations**

- The product was submitted and evaluated for use at the maximum ambient temperature (Tma) permitted by the manufacturer's specification of : 85°C (Depends on load factor. Refer to Enclosed Id 7-01.)
- The product is intended for use on the following power systems : 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 : Primary-SELV: 516 Vpk [For KWS5A series], Primary-SELV: 516 Vpk [For KWS10A series]
- The following secondary output circuits are SELV : Output of all models
- The following secondary output circuits are at non-hazardous energy levels : Output of all models
- 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
- The following magnetic devices (e.g. transformers or inductor) are provided with an OBJ2 insulation system with the indicated rating greater than Class A (105°C) : T1 (Class 130(B))
- The following end-product enclosures are required : Electrical
- The Case and Base have been evaluated to Reinforced insulation, solid insulation and fire barriers.
- The following secondary output circuits are ES1: Output of all models
- The following secondary output circuits are at PS3 energy level: Output of all models
- Humidity conditioning has been conducted by tropical condition.
- Classification of PIS has not been conducted. However, the Case and Base have been evaluated as fire barriers to any PIS parts and/or components inside the unit..
- This component has been evaluated in 'control of fire spread' method, and the Case and Base have been evaluated as fire barriers.

**Additional Information**

Rated Output:

KWS5A-5: DC 5V, 1A  
KWS5A-12: DC 12V, 0.45A  
KWS5A-15: DC 15V, 0.35A  
KWS5A-24: DC 24V, 0.22A

KWS10A-5: DC 5V, 2A  
KWS10A-12: DC 12V, 0.9A  
KWS10A-15: DC 15V, 0.7A  
KWS10A-24: DC 24V, 0.5A

See Enclosure id. 7-01 for Output Derating Specification.

The Clearances and Creepage Distances have additionally been assessed for suitability up to 3000 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 - Company identification | Listee's or Recognized companys name, Trade Name, Trademark or File Number |
| Power rating - Model                  | Model Number   |