

## UL TEST REPORT AND PROCEDURE

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|------------------------------------|--|
| <b>Standard:</b>                   | UL 60950-1, 1st Edition, 2007-10-31 (Information Technology Equipment - Safety - Part 1: General Requirements)<br>CSA C22.2 No. 60950-1-03, 1st Edition, 2006-07 (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>                    | Power Supply, DC-DC (Brick Type)   |
| <b>Model:</b>                      | iQE24*A%V-0##(-R),iQE24*A%V-1##(-R).<br><br>where * represents a three digit current less than or equal to 35A.<br>Values will be expressed in 1A increments.<br><br>where % represents a three digit voltage less than or equal to 15V.<br>Values will be expressed in 100mV increments.<br><br>where 0## or 1## is a three digit alphanumeric indicating a mechanical or control function modification. The 1 in 1## indicates option for baseplate. |
| <b>Rating:</b>                     | The total maximum output power is less than or equal to 120W<br>iQE24*A%V-0(R), iQE24*A%V-1##(-R).<br><br>Input:18-36Vdc, 20A<br>Output:1.2-20Vdc, 35-6A, 36-120W<br><br>Input:19-30Vdc, 20A<br>Output:1.2-20V, 35-6A, 36-120W   |
| <b>Applicant Name and Address:</b> | TDK INNOVETA INC<br>SUITE 100<br>3320 MATRIX DR<br>RICHARDSON TX 75082<br>UNITED STATES  |

Issue Date: 2006-06-01  
2012-01-25

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Report Reference #

E220248-A11-UL

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: Can Nguyen

Reviewed by: Rick Duran

### **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 is a component type DC/DC power module with a planar type power transformer. The converter is provided with input terminal pins for factory installation onto a printed wiring board with a connection to a dc source of supply and output terminal pins.

### **Model Differences**

Models covered within this series are identical except for output electrical rating and optional baseplate.

### **Technical Considerations**

- Equipment mobility : for building-in
- Operating condition : continuous
- Mains supply tolerance (%) : No direct connection
- Tested for IT power systems : No
- IT testing, phase-phase voltage (V) : N/A
- Class of equipment : Class III (supplied by SELV)
- Mass of equipment (kg) : less than 1 kg
- Protection against ingress of water : IP X0
- The product was submitted and evaluated for use at the maximum ambient temperature (T<sub>ma</sub>) permitted by the manufacturer's specification of: 25°C

- The product is intended for use on the following power systems: TN
- The power supply wiring means are meant for building in.

#### **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:

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Consideration should be given to conducting the Heating Test in the End Product. The following components require special consideration during end-product Heating tests due to the indicated maximum temperature measurements during component-level testing: Transformer(T1) winding/trace, which is integrated within the PWB. The PWB is rated 130C.

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The investigated Pollution Degree is: 2

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The unit is to be provided with a Listed 20A fuse on the input of the end product use. If a higher rated fuse is used, additional testing such as Output Short Circuit and Component Faults shall be required.

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The Heating test was conducted with the power supply mounted in a vertical position on its side with forced air cooling from an axial fan mounted 7.6 cm. away from the EUT. Airflow speed was adjusted to 600CFM to maintain maximum temperatures without causing thermal shutdown of EUT.

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For the output to be considered SELV, the input must be from a source that is isolated from the mains (utility) by reinforced insulation.

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If the inputs meet all the requirements for ELV, then the output may be considered ELV.

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The power supply is intended to be supplied by isolated secondary circuitry in an end-use appliance.

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The input-output connectors are not acceptable for field connections and are only intended for connection to mating connectors of internal wiring inside the end use machine. The acceptability of these and the mating connectors relative to secureness, insulating materials, and temperature shall be considered.

#### **Additional Information**

- These models have been evaluated as having Basic insulation from input to output, assuming the possibility of working voltages causing the output voltage to be above SELV.

- The product employs the use of a planar transformer and a multilayer PWB.
- The products may optionally provide a suffix [R] which indicates a non-safety related function.

This report was revise to add suffix "-1##" which indicates option for baseplate.

**Additional Standards**

The product fulfills the requirements of: -

**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  |

**Special Instructions to UL Representative**

N/A

**Production-Line Testing Requirements**

**Electric Strength Test Special Constructions - Refer to Generic Inspection Instructions, Part AC for further information.**

| Model | Component | Removable Parts | Test probe location | V rms | V dc | Test Time, s |
|-------|-----------|-----------------|---------------------|-------|------|--------------|
| N/A   |           |                 |                     |       |      |              |

**Earthing Continuity Test Exemptions - This test is not required for the following models:**

iQE24\*A%V-0##(R)

**Electric Strength Test Exemptions - This test is not required for the following models:**

iQE24\*A%V-0##(R)

**Electric Strength Test Component Exemptions - The following solid-state components may be disconnected from the remainder of the circuitry during the performance of this test:**

**Sample and Test Specifics for Follow-Up Tests at UL**

| Model | Component | Material | Test | Sample(s) | Test Specifics |
|-------|-----------|----------|------|-----------|----------------|
| N/A   |           |          |      |           |                |