

## UL TEST REPORT AND PROCEDURE

<b>Standard:</b>	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)
<b>Certification Type:</b>	Component Recognition
<b>CCN:</b>	QQGQ2, QQGQ8 (Power Supplies for Information Technology Equipment Including Electrical Business Equipment)
<b>Product:</b>	AC-DC Converter
<b>Model:</b>	LD10-20B03, LD10-20B05, LD10-20B09, LD10-20B12, LD10-20B15, LD10-20B24, LD10-20B12K
<b>Rating:</b>	(Optional) Input: 100 -240 Vac, 0.23 A, 50/60Hz. (Optional) Output rating: See enclosure 7-01 for detail ratings.
<b>Applicant Name and Address:</b>	MORNSUN GUANGZHOU SCIENCE & TECHNOLOGY LTD 5 KEHUI ST 1 KEHUI DEVELOPMENT CENTER SCIENCE AVE, GUANGZHOU SCIENCE CITY LUOGANG DISTRICT GUANGZHOU GUANGDONG 510000 CHINA

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: Alvin Peng

### 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 subject units are AC-DC switching mode building-in power supplies. All electronic components mounted on PWB and housed with plastic enclosure and then filled with silicone or colophony.

### Model Differences

-- All Models in this series are identical to each other except for model designation, output rating, some secondary components, transformer secondary winding and auxiliary winding.  
-- Model LD10-20B12K is identical to Model LD10-20B12 except for model designation, secondary PWB layout, transformer secondary pin, and adding insulation sheet between transformer and secondary components.

### Technical Considerations

- 1. Equipment mobility : for building-in
- 1. Connection to the mains : Be evaluated in end system
- 1. Operating condition : continuous
- 1. Access location : Be evaluated in end system
- 1. Over voltage category (OVC) : OVC II
- 1. Mains supply tolerance (%) or absolute mains supply values : +10%, -10% (Declared by Manufacturer)
- 1. Tested for IT power systems : No
- 1. IT testing, phase-phase voltage (V) : N/A
- 1. Class of equipment : Class II (double insulated)
- 1. Considered current rating of protective device as part of the building installation (A) : 20
- 1. Pollution degree (PD) : PD 2
- 1. IP protection class : IP X0
- 1. Altitude of operation (m) : 2000
- 1. Altitude of test laboratory (m) : less than 2000 meters
- 1. Mass of equipment (kg) : 0.048
- 1. Listed fuse, 2A/250 Vac, was connected between mains and unit for all tests. For new alternate new

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Report Reference #

E235235-A18-UL

circuit Diagram: Listed fuse, 3.15A/250 Vac, was connected between mains and unit for all tests.

1. The product was submitted and evaluated for use at the maximum ambient temperature (Tma) permitted by the manufacturer's specification of: At maximum load Tma 55 degree C, and at maximum Tma 70 degree C (Declared by manufacturer). Maximum load see model reference page 7-01 for detail. Tests only were considered at Tma=55 degree C, and Tma=70 degree C. Maximum normal load condition for test: at 55 degree C: output loaded at rated voltage for Models LD10-20B05 (5Vdc/2A), LD10-20B12 (12Vdc/0.9A), LD10-20B24 (24Vdc/0.45A); at 70 degree C: LD10-20B05 (5Vdc/1.4A), LD10-20B12 (12Vdc/0.63A), LD10-20B24 (24Vdc/0.315A), and operated continually.
1. The means of connection to the mains supply is: evaluated in end system
1. The product is intended for use on the following power systems: TN
1. The following circuit locations (with circuit/schematic designation) were investigated as a limited power source (LPS): DC output of Models LD10-20B03, LD10-20B05, LD10-20B09, LD10-20B12, LD10-20B15, LD10-20B24, LD10-20B12K
1. The following are available from the Applicant upon request: Installation (Safety) Instructions / Manual
1. The following accessible locations (with circuit/schematic designation) are within a limited current circuit: CY1 Secondary

#### **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:

1. A Listed fuse, rated 2A/250 Vac, should used in end product. For new alternate new circuit Diagram: Listed fuse, 3.15A/250 Vac, was connected between mains and unit for all tests.
1. Insulation between primary and secondary circuits complies with the requirements for reinforced insulation.
1. The products must be filled with compound in end product. See Table Critical Components for detailed material information.
1. The following Production-Line tests are conducted for this product: Electric Strength
1. The end-product Electric Strength Test is to be based upon a maximum working voltage of: Primary-SELV: 240Vrms, 540Vpk
1. The following secondary output circuits are SELV: DC output of Models LD10-20B03, LD10-20B05, LD10-20B09, LD10-20B12, LD10-20B15, LD10-20B24, LD10-20B12K,
1. The following secondary output circuits are at non-hazardous energy levels: DC output of Models LD10-20B03, LD10-20B05, LD10-20B09, LD10-20B12, LD10-20B15, LD10-20B24, LD10-20B12K,
1. The following secondary output circuits are supplied by a Limited Power Source: DC output of models LD10-20B03, LD10-20B05, LD10-20B09, LD10-20B12, LD10-20B15, LD10-20B24, LD10-20B12K,
1. The power supply terminals and/or connectors are: Not investigated for field wiring
1. The maximum investigated branch circuit rating is: 20 A
1. The investigated Pollution Degree is: 2
1. Proper bonding to the end-product main protective earthing termination is: Not required
1. The following end-product enclosures are required: Mechanical, Electrical
1. The following components require special consideration during end-product Thermal (Heating) tests due to the indicated maximum temperature measurements during component-level testing: See Table 4.5 for details.
1. The following secondary output circuits are Limited Current Circuits: CY1 Secondary

1. 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): T

**Additional Information**

-- The tests related with heating result, such as overload test, and heating test were conducted with filled compound in the unit.  
-- Silicon or Epoxy Potting Compound (filled within unit) Thermal Conductivity: (Provided by manufacturer):  
1. ZHONGSHAN CITY XIAOLAN TOWN ZHI HONG INSULATION MATERIAL FACTORY, Type 5882A/B: 0.615 W/(m·K);  
2. DOW CORNING (SHANGHAI) CO LTD, type CN-8760: 0.63 W/(m·K);  
3. SHIN-ETSU CHEMICAL CO LTD, type KE-1204BL-A: 0.3 W/(m·K);  
4. WEVO-CHEMIE GMBH, Type PU 552 FL (c): 0.61 W/(m·K).

Project 12CA68403:

- upgrading standards to UL60950-1, 2nd Edition and CSA C22.2 NO. 60950-1-07, 2nd Edition with revision date 2011-12-19

Project 4786997766:

- upgrading standards to UL 60950-1, 2nd Edition, 2014-10-14 and CAN/CSA C22.2 No. 60950-1-07, 2nd Edition, 2014-10  
- alternate the new PCB layout and circuit diagram.  
- alternate some Critical Components, see Critical Components tables for details.  
- alternate new Insulation system.

**Additional Standards**

The product fulfills the requirements of: N/A

**Markings and instructions**

Clause Title	Marking or Instruction Details
1.7.1 Power rating - Ratings	Ratings (voltage, frequency/dc, current)
1.7.1 Power rating - Company identification	Listee's or Recognized company's name, Trade Name, Trademark or File Number
1.7.1 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
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**Earthing Continuity Test Exemptions - This test is not required for the following models:**

All models in this report

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

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**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:**

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

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