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平湖市鸿基电器有限公司
TIANBAO WANG



TIANBAO WANG
PINGHU CITY HONGKI ELECTRIC CO LTD
XINCANG TOWN
3F,NO. 309 TONGCHE ROAD
PINGHU
ZHEJIANG 314200 CHINA

Date: 2019/03/30
Subscriber: None
PartySite: 2235945
File No: E504979
Project No: 4788798888
PD No: 19016973
Type: R
PO Number:

Subject: **Initial Production Inspection**

PLEASE NOTE: YOU ARE NOT AUTHORIZED TO SHIP ANY PRODUCTS BEARING ANY UL MARKS UNTIL THE INITIAL PRODUCTION INSPECTION HAS BEEN SUCCESSFULLY CONDUCTED BY THE UL FIELD REPRESENTATIVE.

An Initial Production Inspection (IPI) is an inspection that must be conducted prior to the first shipment of products bearing the UL Mark. This is to ensure that products being manufactured are in accordance with UL's requirements including the Follow-Up Service Procedure. After the UL Representative has verified compliance of your product(s), authorization will be granted for shipment of product(s) bearing the appropriate UL Marks as denoted in the Procedure.

Inspections at your plant will be conducted under the supervision of CHUANGQI LOU,
UL INSPECTION CENTER HANGZHOU,

CHINA NAT'L IMPORT & EXP COM INSP CORP, YAOJIANG DEVELOPING CENTER, 9TH FL, 305
HUANCHENG NORTH RD, HANGZHOU, ZHEJIANG,

China, 310012., PHONE: +86-571-8578-6148, EMAIL: UL.InspectionCenter325@ul.com

Marks as needed may be obtained from UL LABEL CENTER GUANGZHOU, ROOM 3006-
3007, TIMES PROPERTY CENTER, NO 410 DONGFENG RD MIDDLE, GUANGZHOU, GUANGDONG,
China, 510030. PHONE: 208-348-7088, FAX: 208-348-7088, EMAIL:
LABELCENTER.GUZ@UL.COM, ATTN: T WEN

Please file revised pages and illustrations in place of material of like identity.
New material should be filed in its proper numerical order.

NOTE: Follow-Up Service Procedure revisions DO NOT include Cover Pages, Test
Records and Conclusion Pages. Report revisions DO NOT include Authorization Pages,
Indices, Section General Pages and Appendixes.

Please review this material and report any inaccuracies to UL's Customer Service Professionals.
Contact information for all of UL's global offices can be found at <http://ul.com/aboutul/locations>.

If you'd like to receive updated materials FASTER, UL offers electronic access and/or delivery of
this material. For more details, contact UL's Customer Service Professionals as shown above.,
referring to the above Project and/or PD Numbers.

This material is provided on behalf of UL LLC(UL) or any authorized licensee of UL.

NBK File

UL INSPECTION CENTER 325

Production Date: UNKNOWN
Contact: MR. TIANBAO WANG
Phone: 86 13567309057
EMail: bobwang82@163.com

ADDENDUM TO TRANSMITTAL LETTER

TIANBAO WANG
PINGHU CITY HONGKI ELECTRIC CO LTD
XINCANG TOWN
3F,NO. 309 TONGCHE ROAD
PINGHU
ZHEJIANG 314200 CHINA

Date: 2019/03/30
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The following material resulting from the investigation under the above numbers is enclosed.

Issue

<u>Date</u>	<u>Vol</u>	<u>Sec</u>	<u>Pages</u>	<u>Revised Date</u>
2019/03/18	1	1	Cert of Compliance	
2019/03/18	1	1	Add New Volume	

Follow-Up Service Procedure

DO NOT DISCARD THIS PAGE

It is important to keep UL Procedures and Test Reports up-to-date as new or revised pages are received. Correct maintenance will decrease the amount of time the UL Representative spends when visiting your facility.

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PAGES (in content order)	FUNCTION	HOW TO UPDATE
Authorization Page	Displays the Product Category, the type of Follow-Up Service (Type R=Reexamination / Type L=Label), the File Number and the Volume Number associated with each Applicant's, Manufacturer's and Listee's company name and address.	Replace existing page by matching the UL File Number and Volume Number. Discard the older page (refer to "Issued" or "Revised" date).
Addendum to Authorization Page*	Lists the additional names and addresses of manufacturing locations, when multiple locations exist	Replace existing page by matching the UL File Number and Volume Number. Discard the older page (refer to "Issued" or "Revised" date).
Listing Mark Data (LMD), Classification Mark Data (CMD) or Recognized Component Mark Data (RCMD) Pages* #	Used only for products covered under Type R Service. Displays the correct LMD, CMD, or RCMD Mark, the Control Number for Listed and Classified categories and additional information regarding minimum size, application, procurement, and any other optional markings, in addition to the UL Mark.	Replace existing page by matching the UL File Number and Volume Number. Discard the older page (refer to "Issued" or "Revised" date).
Multiple Listing (ML) Correlation Sheet*	Correlates product model numbers between those products made by a Manufacturer for the Basic Applicant and those supplied to another company, the Multiple Listee.	Replace, add or delete page(s) with most current "Issued" or "Revised" date.
Index*	Catalogs the contents of the Procedure by some logical means, i.e. Section Number, Report Reference Number, or Issue Date.	Replace present page by matching the UL File Number, Volume Number, Page Number and most current "Revised" date.
Appendices* # (App.)	Contains instructions for the Manufacturer and UL Representative concerning specific responsibilities and required periodic tests. May also outline tests to be conducted on samples to be forwarded to UL's facilities.	Replace present page by matching the UL File Number, Volume Number, Appendix letter (eg. App. A), Page Number and most current "Revised" date.
	Standardized Appendix Pages are the same for all manufacturers within a particular product category.	Replace present page by matching the Appendix letter (eg. App. A), Page Number and most current "Revised" date.
Follow-Up Inspection Instructions (FUII) Pages*	Contains information similar to that in the Appendices. FUII Pages are issued as part of the Procedure when a UL Standard is used in conjunction with the Procedure, and are the same for all manufacturers within a particular category.	Replace present pages by matching the Page Number and most current "Issued" or "Revised" date.
Section General* # (Sec. Gen.)	Contains description, requirements, identifications and/or specifications that are common to all products covered by the entire volume and supplements the information provided in the Description Section.	Replace present page by matching the UL File Number, Volume Number, Page Number and most current "Revised" date.
Description, or Section (Sec.)*	Contains the specific description of one or more products or systems. This includes written text supplemented by photographs, drawings, etc., as necessary, to define features that affect compliance with the applicable requirements.	Replace present page by matching the UL File Number, Volume Number, Section Number, Page Number and most current "Issued" date.

* The above page(s) may not appear in all UL Follow-Up Service Procedures; UL's Conformity Assessment Services staff determines their inclusion.

These pages are combined in the **Generic Inspection Instructions** for International Style Reports, identified, as example by Vol. X1, X2, etc.

PLEASE NOTIFY YOUR LOCAL UL OFFICE OF ANY CHANGES IN CONTACT NAME, COMPANY NAME OR ADDRESS, SO THIS MATERIAL AND IMPORTANT INFORMATION CONTINUES TO BE DELIVERED TO YOUR FACILITY WITHOUT INTERRUPTION.



File E504979

Vol 1

Auth. Page 1

Issued: 2019-03-29

Revised: 2019-03-30

FOLLOW-UP SERVICE PROCEDURE
(TYPE R)

DIRECT-PLUG-IN AND CORD-CONNECTED CLASS 2 POWER UNITS
(EPBU,EPBU7)

Manufacturer: SEE ADDENDUM FOR MANUFACTURER LOCATIONS

Applicant: 2235945 (Party Site)
PINGHU CITY HONGKI ELECTRIC CO LTD
XINCANG TOWN
3F,NO. 309 TONGCHE ROAD
PINGHU
ZHEJIANG 314200 CHINA

Listee: 2235945 (Party Site)
SAME AS APPLICANT

This Follow-Up Service Procedure authorizes the above Manufacturer(s) to use the marking specified by UL LLC, or any authorized licensee of UL LLC, including the UL Contracting Party, only on products when constructed, tested and found to be in compliance with the requirements of this Follow-Up Service Procedure and in accordance with the terms of the applicable service agreement with UL Contracting Party. The UL Contracting Party for Follow-Up Services is listed on addendum to this Follow-Up Service Procedure ("UL Contracting Party"). UL Contracting Party and UL LLC are referred to jointly herein as "UL."

UL further defines responsibilities, duties and requirements for both Manufacturers and UL representatives in the document titled, "UL Mark Surveillance Requirements" that can be located at the following web-site: <http://www.ul.com/fus>. Manufacturers without Internet access may obtain the current version of this document from their local UL customer service representative or UL field representative. For assistance, or to obtain a paper copy of this document or the Follow-Up Service Terms referenced below, please contact UL's Customer Service at <http://www.ul.com/aboutul/locations/>, select a location and enter your request, or call the number listed for that location.

The Applicant, the specified Manufacturer(s) and any Listee/Classified Co. in this Follow-Up Service Procedure must agree to receive Follow-Up Services from UL Contracting Party. If your applicable service agreement is a Global Services Agreement ("GSA"), the Applicant, the specified Manufacturer(s) and any Listee/Classified Co. will be bound to a Service Agreement for Follow-Up Services upon the earliest by any Subscriber of use of the prescribed UL Mark, acceptance of the factory inspection, or payment of the Follow-Up Service fees which will incorporate such GSA, this Follow-Up Service Procedure and the Follow-Up Service Terms which can be accessed by clicking here: <http://services.ul.com/fus-service-terms>. In all other events, Follow-Up Services will be governed by and incorporate the terms of your applicable service agreement and this Follow-Up Service Procedure.

It is the responsibility of the Listee/Classified Co. to make sure that only the products meeting the aforementioned requirements bear the authorized Marks of UL LLC, or any authorized licensee of UL LLC.

This Follow-Up Service Procedure contains information for the use of the above Manufacturer(s) and representatives of UL and is not to be used for any other purpose. It is provided to the Manufacturer with the understanding that it will be returned upon request and is not to be copied in whole or in part.

This Follow-Up Service Procedure, and any subsequent revisions, is the property of UL and is not transferable. This Follow-Up Service Procedure contains confidential information for use only by the above named Manufacturer(s) and representatives of UL and is not to be used for any other purpose. It is provided to the Subscribers with the understanding that it is not to be copied, either wholly or in part unless specifically allowed, and that it will be returned to UL, upon request.

Capitalized terms used but not defined herein have the meanings set forth in the GSA and the applicable Service Terms or any other applicable UL service agreement.

UL shall not incur any obligation or liability for any loss, expense or damages, including incidental, consequential or punitive damages arising out of or in connection with the use or reliance upon this Follow-Up Service Procedure to anyone other than the above Manufacturer(s) as provided in the agreement between UL LLC or an authorized licensee of UL LLC, including UL Contracting Party, and the Manufacturer(s).

UL LLC has signed below solely in its capacity as the accredited entity to indicate that this Follow-Up Service Procedure is in compliance with the accreditation requirements.

Bruce A. Mahrenholz
Director
Conformity Assessment Programs (CPO)
UL LLC

LOCATION

2235945 (Party Site)
PINGHU CITY HONGKI ELECTRIC CO LTD
XINCANG TOWN
3F,NO. 309 TONGCHE ROAD
PINGHU
ZHEJIANG 314200 CHINA

Factory ID: None
UL Contracting Party for above site is: UL GmbH

(FILE IMMEDIATELY AFTER AUTHORIZATION PAGE)

LISTING MARK

The Listing Mark consists of four elements placed in close proximity and shall appear on Listed products only. Minimum size is not specified, as long as the Listing Mark is legible. The following is suggested.



XXXX = The control number assigned by UL, E504979.

The minimum height of the registered trademark symbol ® shall be 3/64 of an inch. When the overall diameter of the UL Mark is less than 3/8 of an inch, the trademark symbol may be omitted if it is not legible to the naked eye.

The product identity is: "CLASS 2 POWER SUPPLY," "CLASS 2 TRANSFORMER," "CLASS 2 POWER UNIT," "CLASS 2 BATTERY CHARGER," or appropriate product identities, as shown in the individual Listing. The word "Transformer" may be abbreviated "XFMR," "XFRMR" or "XFORMER."

The product identity may be omitted if the Mark is directly and permanently applied to the product by stamping, molding, ink-stamping, silk screening or similar process. The product identity may appear elsewhere on the product if the other three elements are part of the nameplate which includes the rating or the catalog or model designation.

Separable Listing Mark (not part of a nameplate and in the form of decals, stickers or labels) will always include the four elements.

The manufacturer may reproduce the Mark or obtain it from a UL authorized supplier. The list of UL authorized label suppliers can be found on UL's online directory at www.ul.com.

(FILE IMMEDIATELY AFTER AUTHORIZATION PAGE)

LISTING MARK

The Listing Mark consists of four elements placed in close proximity and shall appear on Listed products only. Minimum size is not specified, as long as the Listing Mark is legible. The following is suggested. (If only Canadian coverage is authorized, use only the C-UL Symbol).

UL Symbol to the left and the C-UL Symbol to the right.



Alternatively, the Canadian/US Mark may be used. The UL Symbol with "C" to the left and "US" to the right.



XXXX = The control number assigned by UL, E504979.

The minimum height of the registered trademark symbol ® shall be 3/64 of an inch. When the overall diameter of the UL Mark is less than 3/8 of an inch, the trademark symbol may be omitted if it is not legible to the naked eye.

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The product identity may be omitted if the Mark is directly and permanently applied to the product by stamping, molding, ink-stamping, silk screening or similar process. The product identity may appear elsewhere on the product if the other three elements are part of the nameplate which includes the rating or the catalog or model designation.

Separable Listing Mark (not part of a nameplate and in the form of decals, stickers or labels) will always include the four elements.
THIS FORM PAGE IS TO BE REVISED BY THE NORTHBROOK LABEL DEPARTMENT ONLY

The manufacturer may reproduce the Mark or obtain it from a UL authorized supplier. The list of UL authorized label suppliers can be found on UL's online directory at www.ul.com.

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Product Description/Model	Section	Requirements Evaluated to (USL and/or CNL)
Class 2 Power Supplies, Models HK003-006050AXU, HK003-006045AXU, HK003-006040AXU, HK003- 006035AXU, HK003-006030AXU, HK003-005050AXU, HK003-005040AXU, HK012-120100AXU, HK012- 120090AXU, HK012-120080AXU, HK012-120070AXU, HK012-120060AXU, HK012-120050AXU, HK012- 060100AXU, HK012-060080AXU, HK012-060070AXU, HK012-060060AXU, HK012-050100AXU	1	USL/CNL

ISSUED: 11-13-2007
REVISED: 01-01-2012

STANDARDIZED APPENDIX PAGES
Subject 1310

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STANDARDIZED APPENDIX PAGE (SAP)
Controlled Document: Direct Request for Revision to PDE for Category

Direct Plug-In and Cord-Connected Class 2 Power Units
(EPBU, EPBU2)

STANDARDIZED APPENDIX PAGES

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Direct Plug-In and Cord-Connected Class 2 Power Units
(EPBU, EPBU2)

APPENDIX A - FIELD REPRESENTATIVE'S RESPONSIBILITIES AND INSTRUCTIONS FOR
EXAMINATION OF THE PRODUCT

FIELD REPRESENTATIVE'S RESPONSIBILITIES

The Field Representative's responsibilities include, but are not limited to:

Examine the construction of production bearing, or intended to bear, the UL Mark or Markings to determine compliance with the description of the product and any other requirements expressed in this Procedure.

Where so specified by Appendix B, select samples to be forwarded to the appropriate UL Testing Laboratory for Follow-Up Tests. The packaging and shipment of samples are the responsibility of the manufacturer.

Where so specified by Appendix D, inspect the test records and facilities of the manufacturer to verify that:

- a. The proper number of samples are undergoing the required tests,
- b. The required tests are being performed correctly and appropriate records are maintained,
- c. The proper information is being recorded and is up-to-date,
- d. The instruments being used for the tests have been calibrated at the prescribed interval and are in good working order.

Report to the manufacturer and the UL Responsible Office by means of a Variation Notice (VN) if:

- a. Variations in construction are found,
- b. The manufacturer's method and/or frequency of test is not as described,
- c. The records maintained by the manufacturer are not as described,
- d. The manufacturer's inspection program is not being performed as described,
- e. The manufacturer's test equipment is not properly calibrated, calibrations are not conducted at the prescribed frequency, or calibration certificates/records do not contain all required information. (Note: Variation Notices written for these issues are to be handled under Field Representative control.).

Direct Plug-In and Cord-Connected Class 2 Power Units
(EPBU, EPBU2)

- f. The calibration of the equipment before any adjustments are made is outside of the required tolerance (equipment manufacturer's accuracy specification), or the equipment is determined to be non-operational, discovered to be defective, or has other features that could affect the validity of previous measurements/test results. (Note: for these issues, the VN shall be issued under a Temporary Acceptance status for analysis by the Variation Notice Handling Office).
- g. Nonconforming test results are witnessed during tests conducted specifically for the Field Representative.

Explain to the manufacturer that a Variation Notice is a means of communication with the manufacturer and forms a record of those items where nonconformance with the Procedure has been encountered.

PROCEDURE IN THE EVENT OF NONCONFORMANCE

When a product does not comply with the Follow-Up Service Procedure require that the manufacturer shall either:

- a. Remove any markings referencing UL from the product, or obliterate these markings where the marking is imprinted, die-stamped, molded, etc., or
- b. Modify all products to bring them into compliance with the Follow-Up Service Procedure, or
- c. Hold shipment pending further instructions from UL.

Direct Plug-In and Cord-Connected Class 2 Power Units
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It is the manufacturer's responsibility to forward a copy of the Variation Notice to the Applicant. If the rejection of the product is questioned by the manufacturer and Applicant, the material may be held at the point of inspection, typically at the factory, pending an appeal. The manufacturer has the right to appeal a decision with which they disagree. Appeals of technical decisions and held shipments should be directed to the Variation Notice Handling Office. To resolve issues involving variations in construction, the manufacturer and Applicant may also be offered the option of contacting a Customer Service Professional.

Should UL grant temporary authorization for the continued use of the UL Mark, such temporary authorization shall only be for the time needed to review and/or process the Procedure revisions, or as otherwise specified to cover a particular lot or production run.

When it is decided that UL Marks are to be removed from products, the manufacturer shall demonstrate that all marks referencing UL are removed from the affected material. Those marks referencing UL not destroyed during their removal from the product shall be retrieved from the manufacturer's control by the Field Representative and either (1) held until the manufacturer demonstrates adequate control of their production to assure the application of the Mark to only those products that comply with requirements, (2) returned to the supporting UL Label Center, or (3) destroyed.

Direct Plug-In and Cord-Connected Class 2 Power Units
(EPBU, EPBU2)

APPENDIX B - INSTRUCTIONS FOR FIELD REPRESENTATIVE'S SAMPLE SELECTION

RESERVED FOR FUTURE USE

Direct Plug-In and Cord-Connected Class 2 Power Units
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APPENDIX C - INSTRUCTIONS FOR FOLLOW-UP TESTS AT UL

RESERVED FOR FUTURE USE

Direct Plug-In and Cord-Connected Class 2 Power Units
(EPBU, EPBU2)

APPENDIX D - MANUFACTURER' S RESPONSIBILITIES, CONSTRUCTION CONSIDERATIONS, AND
REQUIREMENTS FOR FACTORY TESTS

The Follow-Up Service Procedure covering the product is loaned to the manufacturer and constitutes the basis on which the product is judged for compliance with the applicable requirements.

MANUFACTURER' S RESPONSIBILITIES

The manufacturer's responsibilities include, but are not limited to:
Control of the UL Mark - Restrict the use of markings that reference UL (either directly by use of the name, an abbreviation of it, or the UL symbol, Classification Mark or Recognized Component Mark, or indirectly by means of agreed-upon markings that are understood to indicate acceptance by UL) to those products that are found by the manufacturer's own inspection to comply with the Follow-Up Service Procedure description. Use of such markings is further limited by the agreements that have been executed by the Subscriber and UL. Confine the application of markings referencing UL to the location or locations authorized in these Appendix Pages or the Follow-Up Service Procedure.

Access to Factory - During hours in which the factory is in operation, provide the Field Representative with free access to any portion of the premises where the product or components thereof are being fabricated, processed, finished or stored, and to the test areas when testing is required in this document. The Field Representative shall be permitted to inspect and witness prescribed tests, prior to shipment, any product bearing or intended to bear markings referencing UL. If product disassembly is required, it shall be undertaken by the manufacturer. Tests required, as part of this Procedure, shall be conducted by the manufacturer.

Corrective Action - Perform a root cause analysis of nonconforming test results reported by UL in order to determine and implement appropriate corrective actions. Upon request, the manufacturer shall submit the findings of their analysis and action plan for review and/or monitoring by UL. For those cases involving questionable test and measuring equipment, the manufacturer shall evaluate and document the effects of the equipment on previous inspections or tests. The manufacturer shall evaluate if the equipment condition could have significantly affected previous inspection or test results and take corrective action as appropriate. The equipment in question shall be removed from service by segregation or prominent labeling and marking.

Production-Line Tests - Conduct the Factory Tests detailed in Appendix D.

Required Records - Maintain records of test performance. Unless indicated otherwise in the Procedure, the information to be recorded should include the model or catalog number, identification of the product, the test conducted, the test date, and the results. The record for a specific lot or group of products may consist only of a statement, without specific details, that the entire lot or group was tested and found acceptable. Generally, a form record sheet should be used to assist in and expedite the record-keeping task. Records are to be retained for at least 6 months and shall be readily available for review by the Field Representative. Note: It is not necessary to keep complete test records when 100% of production is tested, if the manufacturer has an auditable system

Direct Plug-In and Cord-Connected Class 2 Power Units
(EPBU, EPBU2)

in place to confirm that production is always subjected to the required tests. Instead, exception reports indicating noncompliance and corrective action should be retained.

Test Equipment and Personnel - Provide, at a convenient location, all required test equipment and facilities and any required personnel for conducting all tests that are to be performed at the factory. These shall be available when needed so that the inspection work can proceed without undue delay.

Test and Measuring Equipment and Standards Calibration - The Manufacturer shall determine daily that test equipment is functioning properly. In addition,

- a. Unless specified elsewhere in the Follow-Up Services Procedure, all test and measuring instruments required as part of the Follow-Up Services Procedure or used by Field Representatives in the conduct of inspection activity at the factory shall be calibrated yearly (or whenever it has been subject to abuse such as dropped or struck with an object, or its accuracy is otherwise questionable) for its intended use. Exception 1 - Instruments used as part of processing equipment, i.e. equipment used in the manufacturing of the product, are not generally subject to this calibration requirement unless specifically noted otherwise elsewhere in the Follow-Up Services Procedure. Exception 2 - Measuring equipment such as steel rules, tape measures, protractors, and radius gauges typically only need in-service checks to verify their fitness for use.
- b. For in-house calibrations of weights and gauge blocks, the Standard used for the calibrations shall only be used for calibration purposes and be calibrated by a competent body every three years, or whenever the Standard has been subject to some form of abuse that may affect the Standard's fitness for use.
- c. For other Standards (such as Voltmeters), the Standard shall only be used for calibration purposes and be calibrated by a competent body yearly or in accordance with the equipment manufacturer's specifications, as well as, whenever the Standard has been subject to some form of abuse that may affect the Standard's fitness for use.
- d. All Standards shall be stored per the Standard manufacturer's recommendations to protect them from damage or deterioration.
- d. The calibrated test and measuring equipment, and the Standards used for in-house calibration, should be provided with a label or the like indicating the next calibration due date. The manufacturer must keep records of calibrations. The records are to include information equivalent to that noted in item f.

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- f. When calibration service providers are utilized, who are accredited to ISO 17025 and where the calibration certificates show evidence of this accreditation, it is only necessary for the Field Representative to verify that the instrument is covered by the certificate, is within the calibration period and has been calibrated for the measurements for which it will be used. For calibration service providers who are not accredited to ISO 17025 (including in-house calibrations), the Field Representative shall verify the following information on the certificates provided (or records maintained for in-house calibrations):
1. Title, e.g. "Calibration Certificate", "Calibration Report", etc. (or equivalent)
 2. Name and address of laboratory, and the location where the calibration was carried out, if different from the address of the laboratory.
 3. Unique identification of the certificate (such as serial number), and on each page, an identification in order to ensure each page is part of the calibration certificate with a clear indication of the end of the calibration certificate (such as page numbers and total pages - Page X of Y)
 4. Name and address of customer
 5. Description of the condition of the item calibrated (e.g., received out of calibration, damaged, etc.)
 6. Date(s) of performance of the calibration.
 7. Model number and serial number of the item calibrated or other unambiguous identification of the item calibrated.
 8. The measured value(s) of the calibration with units of measurement(s).
 9. A signature and title, or equivalent identification of the persons authorizing the calibration certificate.
 10. Where relevant, a statement to the effect that the results relate only to the items calibrated.
 11. Evidence that the measurements are traceable to national/international standards.
- g. There should not be any alteration to the calibration data/results without laboratory authorization).
- h. When the certificate or report contains results of calibrations performed by subcontractors, these results shall be clearly identified.

Samples for Follow-Up Testing at UL - If Appendix B specifies that samples are required to be forwarded to UL for Follow-Up Testing, the manufacturer shall forward the samples selected by the Field Representative, to the specified UL Testing Laboratory, within five working days of the Field Representative's inspection visit. Packaging and shipment of the samples are the responsibility of the manufacturer.

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(EPBU, EPBU2)

SPECIAL REQUIREMENTS

Special requirements that may also apply to some or all of the products covered by this Procedure include the following:

1. Power Supply Cords

Non-Detachable Power Supply Cord -

A non-detachable power supply cord as described in the individual sections of the Procedure must be provided and shipped with the unit in all cases. The power supply cord and any alternatives must be described in each Procedure section or Section General.

Detachable Power Supply Cord -

The detachable power supply cord as described in the individual sections of the Procedure may or may not be shipped with the unit. Use the guidelines in Table 1 in assisting the manufacturer to apply the alternatives under each of the situations described in the notes to Table 1. Table 1 also includes alternative detachable power supply cords that may be shipped with units intended for use outside the USA and/or Canada.

Direct Plug-In and Cord-Connected Class 2 Power Units
(EPBU, EPBU2)

TABLE 1 - DETACHABLE POWER SUPPLY CORD REQUIREMENTS

The requirements for detachable power supply cords depend on whether the cord is provided.

This table, along with the following notes, details the requirements for each of the possible situations.

Status of Detachable Power Cord	
Provided	Not Provided
Note A or D	(Notes B and C) or (Notes B and E)

NOTE:

- A. The power supply cord should be as described in the Procedure section.
- B. A marking must be provided adjacent to the appliance coupler or at an equivalent location either to inform the user on proper selection of the power supply cord or to see the instruction manual for this information. This marking may be in the form of a tag, nonpermanent label, or product insert that is provided on or packaged with the product so that the marking is visible at the time of installation.
- C. The marking (tag, label, or product insert) or instruction manual must contain complete instructions concerning selection of the proper power supply cord. The reference to the power supply cord must be of a UL Listed detachable power supply cord consisting of the specific configuration of appliance coupler, the cord type, and the electrical rating of the power supply cord as described in the appropriate sections of the Procedure. Refer to Table 2 for equivalent types of cords.
- D. The manufacturer is to supply the Field Representative with information that allows the Field Representative to verify that the products are intended to be sold outside of the USA and/or Canada and that the cord is certified or similarly appropriate for use in the destination country.
- E. The reference to the power supply cord (see Note B) shall include instructions for selection of the proper power supply cord as in the destination country other than the USA or Canada.

Direct Plug-In and Cord-Connected Class 2 Power Units
(EPBU, EPBU2)

TABLE 2 - EQUIVALENT CORDS

Basic Cord Type	Other Suitable Types
TS	TST
SP-2	SPE-2, SPT-2
SP-3	SPE-3, SPT-3
SV	SVE, SVO, SVOO, SVT, SVT0, SVTOO
SJ	SJE, SJO, SJOO, SJT, SJTO, SJTOO
S	SE, SO, SOO, ST, STO, STOO

Direct Plug-In and Cord-Connected Class 2 Power Units
(EPBU, EPBU2)

REQUIREMENTS FOR FACTORY TESTS

The following Production-Line Tests shall be conducted on products covered by this Procedure. During production, test equipment shall be checked for proper operation at least once daily.

A. Production-Line Dielectric Voltage-Withstand Test

General - Except as may be noted under Exceptions in Sp. App. D, the manufacturer shall subject 100 percent of production of all products to a routine Production-Line Dielectric Voltage-Withstand Test in accordance with the following.

Test Equipment - The equipment shall provide the following features.

1. The test equipment shall have a means of indicating the test potential, an audible or visual indicator of electrical breakdown, and, if for automated or station type operations, either a manual-reset device to restore the equipment after electrical breakdown or an automatic-reject feature for any nonconforming unit (appliance). When an ac test potential is applied, the test equipment shall include a transformer having an essentially sinusoidal output.
2. When the rated output of the test equipment is less than 500 volt-amperes, the equipment shall include a voltmeter in the output circuit to directly indicate the applied test potential.
3. When the rated output of the test equipment is 500 volt-amperes or more, the test potential may be indicated by (1) a voltmeter in the primary circuit or in a tertiary-winding circuit, (2) by a selector switch marked to indicate the test potential, or, (3) in the case of equipment having a single test-potential output, by a marking in a readily visible location to indicate the test potential. If an indicating voltmeter is not used, the test equipment shall include a visual means, such as an indicator lamp, to indicate that the test voltage is present at the test-equipment output.

Direct Plug-In and Cord-Connected Class 2 Power Units
(EPBU, EPBU2)

Method - Each unit shall withstand without electrical breakdown the application of an ac potential at a frequency within the range of 40-70 Hz between (1) the primary wiring, including connected components, and accessible dead metal parts, and (2) between the primary wiring, including connected components, and output circuits. If indicated on Sp. App. D page 1, the test potential shall also be applied between primary circuits and the inaccessible transformer core.

For the test, either a sufficient number of control devices are to be closed or separate applications of the test potential are to be made so that all parts of the primary circuit are tested.

The unit may be at intended operating temperature, at room temperature, or at any intermediate temperature for the test.

The test duration and potential shall be:

- A. 1000 Vac for 60 seconds, or
- B. 1200 Vac for one second.

The test potential may be gradually increased to the minimum required value but the full test potential value is to be applied for the specified test duration.

The test shall be conducted when the unit is fully assembled. It is not intended that the unit be rewired, modified, or disassembled for the test.

Exception No. 1: Parts such as snap covers or friction-fit knobs that interfere with performance of the test need not be in place.

Exception No. 2: The test may be performed before final assembly if the test represents that for the completed unit. Any component not included shall not affect the results with respect to determination of possible electric shock from miswiring, defective components, nonconforming spacings, and the like.

Exception No. 3: The test need not be performed using the power supply cord provided with the product. However, if the manufacturer's test method employs a test power supply cord, then the continuity of the test power supply cord conductor connections shall be checked once daily.

Direct Plug-In and Cord-Connected Class 2 Power Units
(EPBU, EPBU2)

When authorized by the Exceptions in Sp. App. D, solid-state components that might be damaged by a secondary effect (induced voltage surge, excessive heating, and the like) of the test may be short-circuited by means of a temporary electrical jumper, or the test may be conducted without the component electrically connected, providing the wiring and terminal spacings are maintained. Additionally, transient voltage suppression devices other than capacitors connected from primary wiring to dead metal may be disconnected during the test.

Basis for Acceptability: All products shall withstand the applied potential without electrical breakdown.

Direct Plug-In and Cord-Connected Class 2 Power Units
(EPBU, EPBU2)

B. Production-Line Grounding Continuity Test

General - Except as may be noted on any Exceptions page included with Sp. App. D, the manufacturer shall subject 100 percent of all products intended to be grounded to a grounding continuity test.

Test Equipment - Any suitable continuity indicating device (such as an ohmmeter, a battery and buzzer combination, or the like) may be used to determine compliance with the Grounding Continuity Test requirements. Additionally, commercial ground continuity testers that pass a current through the grounding path may be used to determine compliance with the same requirements.

Method -

Cord-Connected Units: Grounding continuity shall be determined between the grounding conductor of the attachment plug cap, and/or the designated main grounding point and accessible dead-metal parts of the product, using the test equipment indicated above.

Direct Plug-In Units: Grounding continuity shall be determined between the ground pin and accessible dead-metal parts of the product, using the test equipment indicated above.

Basis for Acceptability - Grounding continuity shall be confirmed between the parts specified.

Direct Plug-In and Cord-Connected Class 2 Power Units (EPBU, EPBU2)

PRODUCTS WHICH REQUIRES PRODUCTION DIELECTRIC TEST BETWEEN
PRIMARY CIRCUIT PARTS AND INACCESSIBLE TRANSFORMER CORE
(see Method, Appendix D Page 8)

Product Designation

Procedure Section or Date

Reserved for future use

Direct Plug-In and Cord-Connected Class 2 Power Units (EPBU, EPBU2)

Exceptions

Production-Line Dielectric Voltage-Withstand Test

1. Production-Line Dielectric Voltage-Withstand Test Voltages - For products which have specific testing conditions, the voltage to be used for the Production-Line Dielectric Voltage-Withstand Test on 100% of production is specified below.

Procedure Section or Date	Product Designation	Test Potential V ac	Test Potential V dc	Time Seconds	Applied Between
Reserved for future use					

Comments:

2. Production Exempt From Production-Line Dielectric Voltage-Withstand Test - Based on engineering judgment, this test is not required to be performed on the following products.

Product Name	Product Designation	Procedure Section or Date
Reserved for future use		

3. Components Exempt From Production-Line Dielectric Voltage-Withstand Test - The following components may be disconnected from the remainder of the circuitry during the performance of this test.

Product Name	Product Designation	Component Designation	Procedure Section or Date Fig., Item, Ill.
Reserved for future use			

Direct Plug-In and Cord-Connected Class 2 Power Units (EPBU, EPBU2)

Exceptions

Production-Line Grounding Continuity Test

Based on engineering judgment, this test is not required to be performed on the following products.

Product Name	Product Designation	Procedure Section or Date
All models covered in this procedure		

PRODUCT COVERED:

Direct Plug-In and Cord-Connected Class 2 Power Units.

FACTORY LOCATION AND IDENTIFICATION:

When more than one manufacturing location is indicated on the Authorization Page Addendum for the Procedure Volume. The factory identification and associated manufacturing location are indicated on the Authorization Page Addendum.

TECHNICAL CONSIDERATIONS (NOT FOR FIELD REPRESENTATIVE USE):

Products designated USL have been investigated using requirements contained in the Standard for Class 2 Power Units, UL 1310, 7th Edition.

Products designated CNL have been investigated to Canadian requirements using requirements contained in CAN/CSA C22.2 No. 223, 3rd Edition.

"CSA Certified" indicates that the component has been evaluated to Canadian requirements. The Field Representative shall confirm that the component has a Canadian UL Listing or Recognition Mark, a CSA Certification Mark or an equivalent identifier. If the Power Unit does not bear the C-UL or C-UR Mark, the "CSA Certified" reference should be disregarded.

Circuit Designation -

Primary Circuit (PRI) - indicates an internal circuit that is directly connected to the external supply mains or other equivalent source which supplies the electric power.

Secondary Circuit (SEC) - indicates a circuit which has no direct connection to primary power and derives its power from a transformer, converter, or equivalent isolation device situated within the equipment, and does not exceed Class 2 Voltage, Current, and Power Limitations.

MARKINGS:

Application -

1. Markings are molded, die-stamped, paint-stenciled, stamped or etched in metal or indelibly stamped or printed on pressure-sensitive label secured by adhesive.
2. Unless otherwise specified, pressure sensitive labels which contain any of the required markings shall be R/C (PGDQ2/8) suitable for minimum 80°C and for the surface material or finish to which adhered.

Product Marking - All units shall be marked with the following.

1. Listee's name or File number or trademark as specified in Note 1 below.
2. Model designation.
3. Electrical ratings, including input voltage or voltage range, input frequency and, if specified in the individual Reports, input amperes, volt-amperes or wattage rating. Additionally, output voltage in ac or dc and output current in amperes, volt-amperes or watts shall be marked, unless the unit is a battery charger marked for use with a specific battery pack.
4. Output polarity (Note 2).
5. Date code (Note 3).
6. Factory identification if applicable.
7. Product Identification and Use. A unit shall be marked with one of the following terms, as applicable. See individual Reports.
 - a) "Class 2 Battery Charger,"
 - b) "Class 2 Transformer,"
 - c) "Class 2 Power Supply," or
 - d) "Class 2 Power Unit."

Note 1: The following marking or trademark may be used to identify the Listee: (None)

Note 2: The polarity of a direct current output shall be plainly marked unless the unit is provided with a polarized output termination.

Note 3: Date Code - Consist of four digits.

The date code consists of the following: MMY
MM = Month, YY = Years, example: "1118" means November, 2018;

8. Cautionary Markings - Shall include the following:

"CAUTION" and "Risk of electric shock" and the following: "Dry location use only" or "Do not expose to liquid, vapor, or rain."

See also individual Reports.

A cautionary marking shall be located on a part that cannot be removed without impairing the operation of the unit, or it may be provided on a permanent tag secured to the output or input cord.

The tag shall be of cloth, plastic or other durable material and large enough to accommodate the required marking. The tag may be either a flat tag with a hole large enough for the cord but not so large that it can be easily torn from the cord, or the tag may be an adhesive back, flag-type tag wrapped tightly around the cord. The ends of the tag are to adhere to each other and form the flag.

Markings on a tag are to be printed in contrasting colors on a background other than blue or yellow.

The tag shall be marked "Do Not Remove This Tag" or the equivalent in letters minimum 2.4 mm (3/32 in.) tall.

Note 4: The words "CAUTION", "WARNING", and/or "DANGER" shall be in letters not less than 3.2 mm (1/8 in.) tall, remaining letters not less than 1.6 mm (1/16 in.) tall.

CONSTRUCTION DETAILS:

General - Unless otherwise described in the individual Reports, the following paragraphs apply to all products included in this Procedure.

Abbreviations -

Sec. Gen.	- Sectional General
R/C	- Recognized Component
USL	- United States, Listed
CNL	- Canadian Standard, Listed

Blades - Folded over or solid, copper, brass or bronze. Located minimum 5.1 mm for UL and CUL requirement from edge of enclosure. See Sec. Gen., ILL. 1 for dimensions, spacing and relative location of blades.

Spacings - Minimum spacings between live parts of opposite polarity and between live and dead-metal parts shall be as specified below:

SPACINGS IN UNITS HAVING OPENINGS IN THE ENCLOSURE &
SPACINGS IN UNITS FOR OUTDOOR USE

Potential Involved, Volts, rms	Through-Air mm (inch)	Over-Surface mm (inch)
50 or less	1.6 (1/16)	1.6 (1/16)
51 - 150	3.2 (1/8)	6.4 (1/4)
151 - 250	6.4 (1/4)	9.5 (3/8)
251 - 600	9.5 (8/3)	12.7 (1/2)

SPACINGS IN UNITS WITHOUT OPENINGS IN THE ENCLOSURE

Potential Involved, Volts, rms	Through-Air mm (inch)	Over-Surface mm (inch)
50 or less	1.6 (1/16)	1.6 (1/16)
51 - 150	1.6 (1/16)	1.6 (1/16)
151 - 250	4.8 (3/16)	4.8 (3/16)
251 - 600	6.4 (1/4)	6.4 (1/4)

Segregation - Insulated conductors of different circuits shall be provided with spacings as specified above unless both circuits are insulated for the highest voltage involved. Insulated conductors shall be maintained away from bare live parts of different circuits, sharp edges, and heat producing components by routing or clamping.

Alternate - Segregation may be maintained by use of a barrier. Refer to the individual Reports for details concerning barrier.

Class 2 Secondary Circuit Spacings - Not specified as spacings are based on Dielectric voltage-Withstand Tests.

Printed Wiring Boards - Unless designated as "SEC", all printed wiring boards (PWB), shall be R/C ZPMV2, with a minimum flammability rating of V-2 for units without openings, V-1 for units with openings, and have a minimum operating temperature rating of 90°C. Also, the solder time and temperature of any wave soldering machines shall not exceed the values indicated in the Component Recognition Report or Directory. Hand soldered boards shall be examined for charring, burned areas or other damage.

See also the individual Reports for additional requirements or instructions that may supersede these instructions.

Internal Wiring - Unless otherwise specified, internal wiring shall be R/C (AVLV2/8), rated minimum 300 V, minimum 80°C.

Electrical Connections - Electrical connections may be accomplished by soldering or use of wire connectors.

Wire connectors or terminals, shall be Listed or Recognized (ZMVV2), suitable for the type, size and number of conductors and applied using the tool recommended by the connector manufacturer. Additionally, terminals shall be of the closed loop, or spade type with upturned ends.

Quick connect terminals shall be Listed with integral detent or locking type, suitable for the type, size and number of conductors and applied using the tool recommended by the connector manufacturer.

Solder connections shall be mechanically secured prior to soldering. Printed wiring assemblies may be wave soldered.

Insulation Tubing/Sleeving - R/C (YDPU2/8); R/C (YDTU2/8); R/C (UZFT2), or R/C (UZKX2/8), rated minimum 90°C, 300 V.

Wire Positioning Devices - Unless otherwise specified, R/C ZODZ2, rated minimum 60°C.

Corrosion Protection - Iron and steel parts shall be protected against corrosion by painting, plating, galvanizing or enameling.

Exception: Laminations and small parts of iron or steel such as washers or screws that are not current carrying parts do not require corrosion protection.

Instruction Manual - The following instructions shall be provided in the instruction manual.

1. The operating orientation of a direct plug-in power unit shall be indicated in the instructions as follows:

"This power unit is intended to be correctly orientated in a vertical or floor mount position." or equivalent wording.

Alternate - The instructions may be marked on the units.

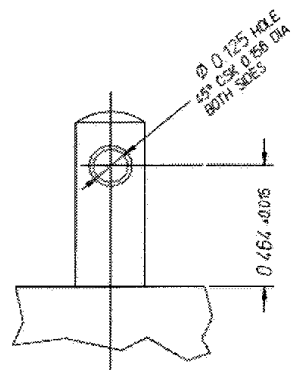
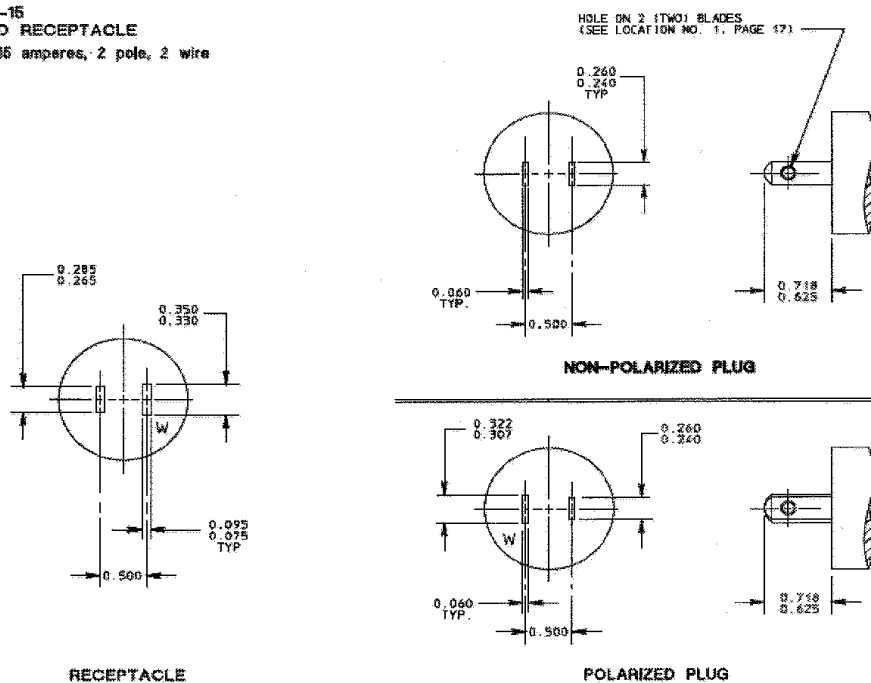
Note: The instruction is not required for a direct plug-in power unit weighing 1 pound (454 g) or less.

2. The instructions for a power unit intended for use by travelers shall include (a) - (c) or the equivalent, as appropriate. The items shall be preceded by "IMPORTANT SAFETY INSTRUCTIONS - SAVE THESE INSTRUCTIONS" and "DANGER - TO REDUCE THE RISK OF FIRE OR ELECTRIC SHOCK. CAREFULLY FOLLOW THESE INSTRUCTIONS" in letters of 1/8 inch (3.18 mm) high or in a readily visible contrasting text.

- (a) "Be sure voltage selector is in correct voltage position before plugging in."
- (b) "For use in the U.S.A., the voltage selector switch must be placed in the 120 volt position. For use in countries other than the U.S.A., the voltage selector may need to be placed in other than the 120 volt position. Confirm the voltage available at each country location before using the product."
- (c) "For connection to a supply not in the U.S.A., use an attachment plug Adapter of the proper configuration for the power outlet, if needed." or "If the shape of the plug does not fit the power outlet, use an attachment plug adaptor of the proper configuration for the power outlet."

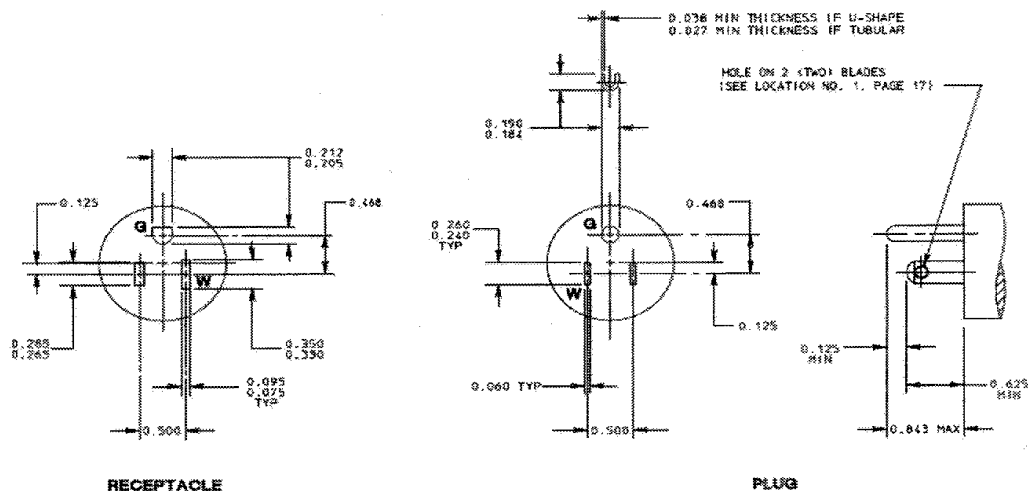
Note: Items (a) and (b) are only for unit employed voltage selector.

FIGURE 1-15
PLUG AND RECEPTACLE
125 volts, 15 amperes, 2 pole, 2 wire



N191909088

FIGURE 5-15
PLUG AND RECEPTACLE
 125 volts, 15 amperes, 2 pole, 3 wire, Grounding type



1. All dimensions are in inches, unless otherwise specified.
2. Decimal dimensions without tolerances shall be subject to a plus or minus 0.005-inch tolerance.
3. Angular dimensions without tolerances shall be subject to a plus or minus 1 degree tolerance.
4. "G" denotes equipment ground.
5. "W" denotes system ground.
6. Leading edges of plug blades shall be free of burrs and sharp edges.
7. All slots and slot tolerances are symmetrically located about centerlines.
8. Female contacts associated with plug blades that are 0.125 minimum longer than other blades are engaged prior to the other female contacts.

DESCRIPTION

PRODUCT COVERED:

USL, CNL - Class 2 Power Supply, Models HK003-006050AXU, HK003-006045AXU, HK003-006040AXU, HK003-006035AXU, HK003-006030AXU, HK003-005050AXU, HK003-005040AXU, HK012-120100AXU, HK012-120090AXU, HK012-120080AXU, HK012-120070AXU, HK012-120060AXU, HK012-120050AXU, HK012-060100AXU, HK012-060080AXU, HK012-060070AXU, HK012-060060AXU, HK012-050100AXU.

GENERAL:

Each unit covered by this Report is a direct plug-in type Class 2 Power Supply.

Each unit consists of a switch mode transformer and other related electronic circuitry house in thermoplastic enclosure, and provide with non-polarized parallel blades for connection to line voltage.

Each unit does not include a grounding connection, and has no user accessible metal part which is likely to become energized. It is intended for dry location use only.

ELECTRICAL RATINGS:

Model	Input			Output		
	V ac	Hz	A	V dc	mA	W
HK003-006050AXU	100-120	50/60	0.2	6	500	3
HK003-006045AXU	100-120	50/60	0.2	6	450	2.7
HK003-006040AXU	100-120	50/60	0.2	6	400	2.4
HK003-006035AXU	100-120	50/60	0.2	6	350	2.1
HK003-006030AXU	100-120	50/60	0.2	6	300	1.8
HK003-005050AXU	100-120	50/60	0.2	5	500	2.5
HK003-005040AXU	100-120	50/60	0.2	5	400	2

Model	Input			Output		
	V ac	Hz	A	V dc	mA	W
HK012-120100AXU	100-120	50/60	0.3	12	1000	12
HK012-120090AXU	100-120	50/60	0.3	12	900	10.8
HK012-120080AXU	100-120	50/60	0.3	12	800	9.6
HK012-120070AXU	100-120	50/60	0.3	12	700	8.4
HK012-120060AXU	100-120	50/60	0.3	12	600	7.2
HK012-120050AXU	100-120	50/60	0.3	12	500	6
HK012-060100AXU	100-120	50/60	0.2	6	1000	6
HK012-060080AXU	100-120	50/60	0.2	6	800	4.8
HK012-060070AXU	100-120	50/60	0.2	6	700	4.2
HK012-060060AXU	100-120	50/60	0.2	6	600	3.6
HK012-050100AXU	100-120	50/60	0.2	5	1000	5

TECHNICAL CONSIDERATIONS (Not For Field Representative's Use):

USL indicates investigation to the U.S. Standard for Class 2 Power Units, UL 1310, Seventh Edition.

CNL indicates investigation to the Canadian Standard for Power Supplies with Extra-Low-Voltage Class 2 Outputs, CAN/CSA-C22.2 No. 223, Third Edition.

The maximum room ambient temperature is 25°C (Tmra).

This unit weights less than 1 pound (454g).

CONSTRUCTION DETAILS:

Section General - The following construction items are described in Section General.

Abbreviations	Date of Manufacturing
Corrosion Protection	Cautionary Markings
Segregation	Spacings
Blade Construction	Printed Wiring Board
Markings	

For CNL Unit, markings and instructions shall be provided in both English and French.

Markings - See Sec. Gen., Markings for detail. The following markings shall be additionally provided:

"Class 2 Power Supply"

"CAUTION - Risk of Electric Shock." and the following, "Do not expose to liquid, vapor, or rain" or "Dry location use only".

"ATTENTION : POUR UTILISATION A L'INTERIEUR SEULEMENT"



or

Illustrations - The following Illustration is referenced in this report:

ILL. No.	Description
1	Enclosure Construction
2	Drawing of Output Cord Strain Relief Bushing
3	PWB Component and Trace Layout for Models HK012 Series
4	PWB Component and Trace Layout for Models HK003 Series
5	LF1 Specification for Models HK012 Series
6	Transformer Construction and Insulation for Models HK003 Series
7	Transformer Construction and Insulation for Models HK012 Series (Output 6V dc and 5V dc)
8	Transformer Construction and Insulation for Models HK012 Series (Output 12V dc)
9	Size of dimensions of the Spring connectors

General - The general design, shape, and arrangement shall be as illustrated in the following figures, except where variations are specifically described.

CLASS 2 POWER SUPPLY, MODEL HK012-120100AXU - FIGS. 1
(ALSO REPRESENTS ALL SERIES COVERED UNDER THIS REPORT)

General - Figs. 1 represent the external view of Model HK012-120100AXU.

1. Enclosure - R/C (QMFZ2), SABIC INNOVATIVE PLASTICS B V (E45329), Type 943(f1), PC, AO color, rated V-0, HWI=3, HAI=3, 120°C, overall measures approx. 61.0 by 41.0 by 30.0 mm, minimum 1.5 mm thick. Two halves construction, secured together by ultrasonic welding. Provided with one opening for output cord strain relief, measures approx. 7.0 by 5.2 mm. See ILL. 1 for construction details.
2. Input Blades - Non-polarized, non-grounding type. Plated copper alloy, two provided. Each blade located minimum 7.3 mm from the edge of enclosure perimeter. See Section General, Blades for construction details and dimensions. Molded to Enclosure.
3. Output Cord Strain Relief Bushing - PVC bushing integrally molded on Output Cord and physically fitted in Enclosure. See ILL. 2 for construction details.
4. Output Cord - R/C (AVLV2/8), two-conductors, stranded, minimum 300 V, minimum 80 °C, minimum 26 AWG. Provided with minimum 0.33 mm thick PVC insulation on each lead. One end terminated internally on PWB by soldering and mechanically secured before soldering. The other end terminated in a non-standard polarized output connector. Minimum 1.8 m external length. Provided with molded-on strain relief.
5. Input Contacts - Two spring connectors, stainless steel, min. 0.2 mm thick. See ILL. 9 for construction.

CLASS 2 POWER SUPPLY, MODELS HK003-006050AXU - FIGS. 2 AND 3
(ALSO REPRESENTS ALL MODELS HK003 SERIES COVERED UNDER THIS REPORT)

General - Figs. 2 and 3 show the internal views of Model HK003-006050AXU.

1. Printed Wiring Board (PWB) - R/C (ZPMV2), rated minimum 130°C, V-1. Minimum 1.2 mm thick, overall approx. 55.0 by 35.0 mm. See ILL. 4 for component and trace layouts.
2. Fuse (F1) - R/C (JDYX2/8), DONGGUAN BETTER ELECTRONICS TECHNOLOGY CO LTD (E300003), Type 932, non-time-delay type, rated 250 Vac, 1 A.
3. Bridge Diode (BD1) - Rated minimum 1.0 A, minimum 1000 V. Secured on PWB by soldering.
4. Capacitors (EC1, EC2) - Electrolytic with integral pressure relief. Rated 400 V, 4.7 uF, minimum 105°C.
5. Capacitor (EC3) - Electrolytic with integral pressure relief. Rated 50 V, 4.7 uF, minimum 105°C.
6. Capacitors (EC4, EC5) - Electrolytic with integral pressure relief. Rated 25 V, 220 uF, minimum 105°C for Capacitor EC4. Capacitor EC5 is not provided.
7. IC (U1) - Manufactured by MIX-DESIGN, Type MD1801.
8. Current Sensor Resistors (R4, R6) - Each rated min. 1 ohm, minimum 1/4 W. Secured on PWB by soldering.
9. Y-Capacitor (CY1) - R/C (FOWX2/8), rated maximum 1000 pF, minimum 250 Vac, Y1 Type, 125°C. Following types may be used.

Manufacturer / File No.	Type
SHANTOU HIGH-NEW TECHNOLOGY DEVELOPMNT ZONE SONGTIAN ENTERPRISE CO LTD (E208107)	CD
JYA-NAY CO LTD (E201384)	JN
SUCCESS ELECTRONICS CO LTD (E114280)	SE

10. Diodes (D3, D4) - Rated minimum 60 V, minimum 2.0 A.
11. Inductor (L1) - Rated 2.2 mH.
12. Transformer (T1) - Employed R/C (OBJY2), BILLION ELECTRIC CO LTD (E150529), Class 130 (B) electrical insulation systems, designated HIS-8A, Table I. See ILL. 6 for Transformer overall view. Transformer construction and Insulation. Constructed as below:
 - A. Core - Ferrite, E-E construction, overall measures 15.0 mm by 13.5 mm by 6.5 mm width, wrapped by two layers of Insulation Tape, each 0.05 mm thick, 6.0 mm width. Core is considered as primary part.

- B. Bobbin - R/C (QMFZ2), HITACHI CHEMICAL CO LTD (E42956), Type CP-J-8800, Phenolic, black or brown in color, rated V-0, 150 °C, measure minimum 0.64 mm thick.
- C. Primary Windings (N1, N2, N4) - R/C (OBMW2), rated minimum 130°C, various ANSI Types covered in Insulation System,, see ILL. 6 for Windings Information details.
- D. Secondary Winding (N3) - R/C (OBJT2), FURUKAWA ELECTRIC CO LTD (E206440), Type TEX-E, rated 130 °C, see ILL. 6 for Windings Information details.
- E. Insulation Tape - R/C (OANZ2), 3M COMPANY ELECTRICAL MARKETS DIV (EMD) (E17385), Type 1350F-1 or 1350F-2, all color, rated 130 °C, 0.05 mm thick per layer.
- F. Varnish - R/C (OBOR2), HITACHI CHEMICAL CO LTD (E72979), Type WA-238A, rated min. 130°C.
- G. Tube - R/C (YDPU2), ZEUS INDUSTRIAL PRODUCTS INC (E64007), not heat-shrinkable PTFE tubing, Type TFE-TW-300, rated minimum 300 V, 200°C.
- H. Primary Crossover Lead insulation - Two layers of insulation tape and tube.
- I. Transformer insulation provided as follows:

Location	Material	Layers	Single layer Thick (mm)
Outer-wrap	Insulation Tape	2	Min. 0.05
N4 to N3	Insulation Tape	2	Min. 0.05
N3 to N2	Insulation Tape	2	Min. 0.05
N2 to N1	Insulation Tape	2	Min. 0.05
N1 to Core	Bobbin	-	Min. 0.64

13. Varistor (VR1) - Not provided.

CLASS 2 POWER SUPPLY, MODELS HK012-120100AXU - FIGS. 4 AND 5
(ALSO REPRESENTS ALL MODELS HK012 SERIES COVERED UNDER THIS REPORT)

General - Figs. 4 and 5 show the internal views of Model HK012-120100AXU.

1. Printed Wiring Board (PWB) - R/C (ZPMV2), rated minimum 130°C, V-1. Minimum 1.2 mm thick, overall approx. 55.0 by 35.0 mm. See ILL. 3 for component and trace layouts.
2. Fuse (F1) - R/C (JDYX2/8), DONGGUAN BETTER ELECTRONICS TECHNOLOGY CO LTD (E300003), Type 932, non-time-delay type, rated 250 Vac, 1 A.
3. Bridge Diode (BD1) - Rated minimum 1.0 A, minimum 1000 V. Secured on PWB by soldering.
4. Capacitors (EC1, EC2) - Electrolytic with integral pressure relief. Rated 400 V, 10 uF, minimum 105°C.
5. Capacitor (EC3) - Electrolytic with integral pressure relief. Rated 50 V, 4.7 uF, minimum 105°C.
6. Capacitors (EC4, EC5) - Electrolytic with integral pressure relief. Rated 16 V, 470 uF, minimum 105°C for Capacitor EC4. Capacitor EC5 is not provided.
7. IC (U1) - Manufactured by MIX-DESIGN, Type MC1109.
8. Current Sensor Resistors (R9, R11) - Each rated min. 1 ohm, minimum 1/4 W. Secured on PWB by soldering.
9. Y-Capacitor (CY1) - R/C (FOWX2/8), rated maximum 1000 pF, minimum 250 Vac, Y1 Type, 125°C. Following types may be used.

Manufacturer / File No.	Type
SHANTOU HIGH-NEW TECHNOLOGY DEVELOPMNT ZONE SONGTIAN ENTERPRISE CO LTD (E208107)	CD
JYA-NAY CO LTD (E201384)	JN
SUCCESS ELECTRONICS CO LTD (E114280)	SE

10. Diodes (D3, D4) - Rated minimum 60 V, minimum 2.0 A.
11. Inductor (L1) - For Models output 6V dc and 5V dc, Rated 2.2 mH.
12. Line Choke (LF1) - For Models output 12V dc, rated minimum 16 mH. See ILL. 5 for construction details. Constructed as below:
 - a. Core - Ferrite, overall size: 9.2 mm by 9.2 mm by 3.8 mm.
 - b. Bobbin - R/C (QMFZ2), CHANG CHUN PLASTICS CO LTD (E59481), Type T375J, Phenolic, black or brown in color, rated V-0, 150 °C, measure minimum 0.64 mm thick.

- c. Windings - R/C (OBMW2), rated 130°C, each winding diameter 0.15 mm by 80 turns.

The spacing between two windings is minimum 1.6 mm.

- d. Insulation Tape - R/C (OANZ2), 3M COMPANY ELECTRICAL MARKETS DIV (EMD) (E17385), Type 1350F-1(b) or 1350F-2(c), all color, rated 130 °C, 0.05 mm thick per layer.

- e. Varnish - R/C (OBOR2), rated min. 130 °C.

- 12. Transformer (T1) - For Models output 6V dc and 5V dc. Employed R/C (OBJY2), BILLION ELECTRIC CO LTD (E150529), Class 130 (B) electrical insulation systems, designated HIS-8A, Table I. See ILL. 7 for Transformer overall view. Transformer construction and Insulation. Constructed as below:

- A. Core - Ferrite, E-E construction, overall measures 17.5 mm by 15.2 mm by 7.8 mm width, wrapped by three layers of Insulation Tape, each 0.05 mm thick, 8.0 mm width. Core is considered as primary part.
- B. Bobbin - R/C (QMFZ2), HITACHI CHEMICAL CO LTD (E42956), Type CP-J-8800, Phenolic, black or brown in color, rated V-0, 150 °C, measure minimum 0.64 mm thick.
- C. Primary Windings (N1, N2, N4) - R/C (OBMW2), rated minimum 130°C, various ANSI Types covered in Insulation System,, see ILL. 7 for Windings Information details.
- D. Secondary Winding (N3) - R/C (OBJT2), FURUKAWA ELECTRIC CO LTD (E206440), Type TEX-E, rated 130 °C, see ILL. 7 for Windings Information details.
- E. Insulation Tape - R/C (OANZ2), 3M COMPANY ELECTRICAL MARKETS DIV (EMD) (E17385), Type 1350F-1 or 1350F-2, all color, rated 130 °C, 0.05 mm thick per layer.
- F. Varnish - R/C (OBOR2), HITACHI CHEMICAL CO LTD (E72979), Type WA-238A, rated min. 130°C.
- G. Tube - R/C (YDPU2), ZEUS INDUSTRIAL PRODUCTS INC (E64007), not heat-shrinkable PTFE tubing, Type TFE-TW-300, rated minimum 300 V, 200°C.
- H. Primary Crossover Lead insulation - Two layers of insulation tape and tube.
- I. Transformer insulation provided as follows:

Location	Material	Layers	Single layer Thick (mm)
Outer-wrap	Insulation Tape	2	Min. 0.05
N4 to N3	Insulation Tape	2	Min. 0.05
N3 to N2	Insulation Tape	2	Min. 0.05
N2 to N1	Insulation Tape	2	Min. 0.05
N1 to Core	Bobbin	-	Min. 0.64

13. Transformer (T1) - For Models output 12V dc. Employed R/C (OBJY2), BILLION ELECTRIC CO LTD (E150529), Class 130 (B) electrical insulation systems, designated HIS-8A, Table I. See ILL. 8 for Transformer overall view. Transformer construction and Insulation. Constructed as below:

- A. Core - Ferrite, E-E construction, overall measures 17.5 mm by 15.2 mm by 7.8 mm width, wrapped by two layers of Insulation Tape, each 0.05 mm thick, 8.0 mm width. Core is considered as primary part.
- B. Bobbin - R/C (QMFZ2), HITACHI CHEMICAL CO LTD (E42956), Type CP-J-8800, Phenolic, black or brown in color, rated V-0, 150 °C, measure minimum 0.64 mm thick.
- C. Primary Windings (N1, N2, N4) - R/C (OBMW2), rated minimum 130°C, various ANSI Types covered in Insulation System,, see ILL. 8 for Windings Information details.
- D. Secondary Winding (N3) - R/C (OBJT2), FURUKAWA ELECTRIC CO LTD (E206440), Type TEX-E, rated 130 °C, see ILL. 8 for Windings Information details.
- E. Insulation Tape - R/C (OANZ2), 3M COMPANY ELECTRICAL MARKETS DIV (EMD) (E17385), Type 1350F-1 or 1350F-2, all color, rated 130 °C, 0.05 mm thick per layer.
- F. Varnish - R/C (OBOR2), HITACHI CHEMICAL CO LTD (E72979), Type WA-238A, rated min. 130°C.
- G. Tube - R/C (YDPU2), ZEUS INDUSTRIAL PRODUCTS INC (E64007), not heat-shrinkable PTFE tubing, Type TFE-TW-300, rated minimum 300 V, 200°C.
- H. Primary Crossover Lead insulation - Two layers of insulation tape and tube.

I. Transformer insulation provided as follows:

Location	Material	Layers	Single layer Thick (mm)
Outer-wrap	Insulation Tape	2	Min. 0.05
N4 to N3	Insulation Tape	2	Min. 0.05
N3 to N2	Insulation Tape	2	Min. 0.05
N2 to N1	Insulation Tape	2	Min. 0.05
N1 to Core	Bobbin	-	Min. 0.64

14. Varistor (VR1) - Not provided.



N191909072



N191909073



N191909074



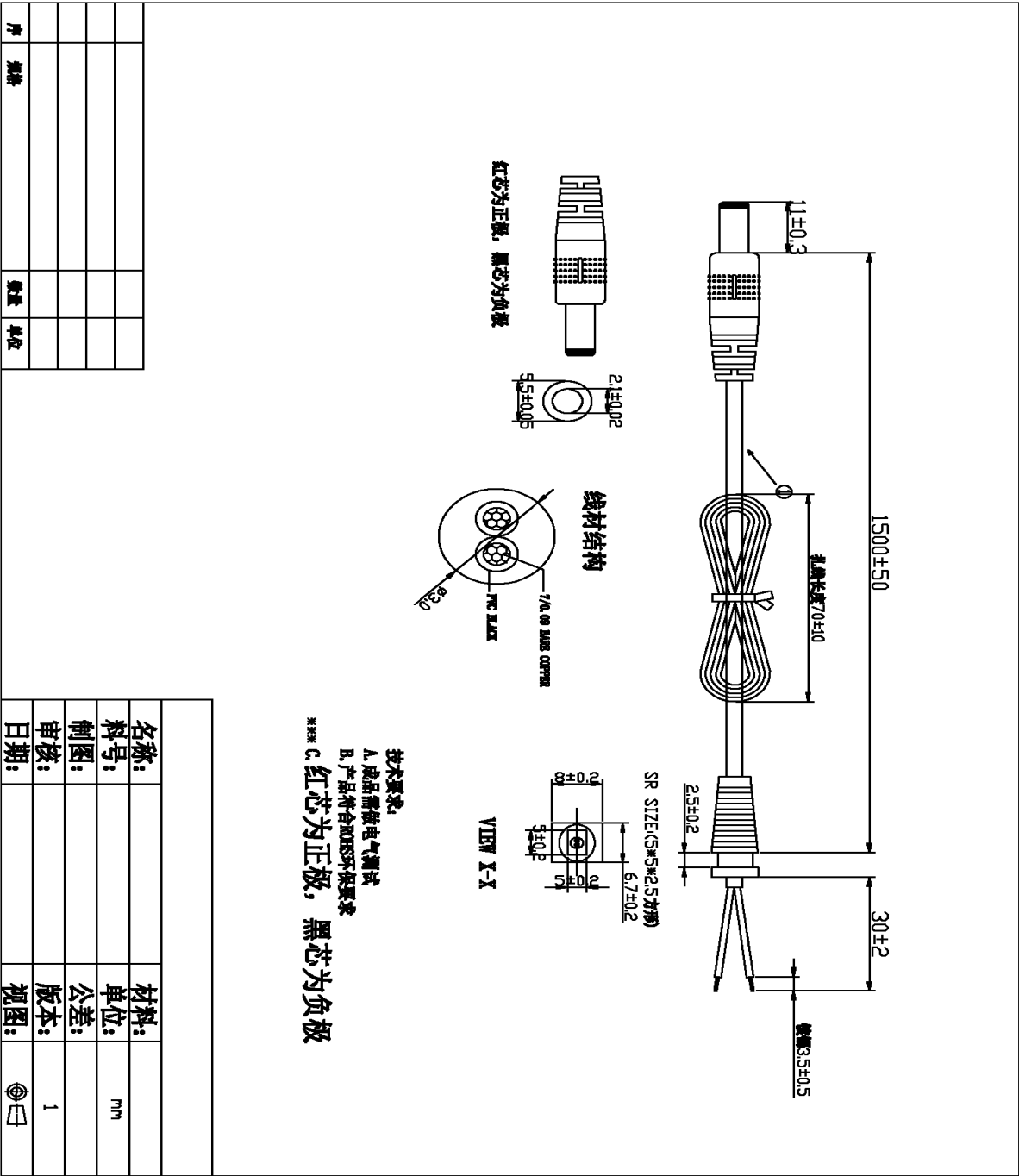
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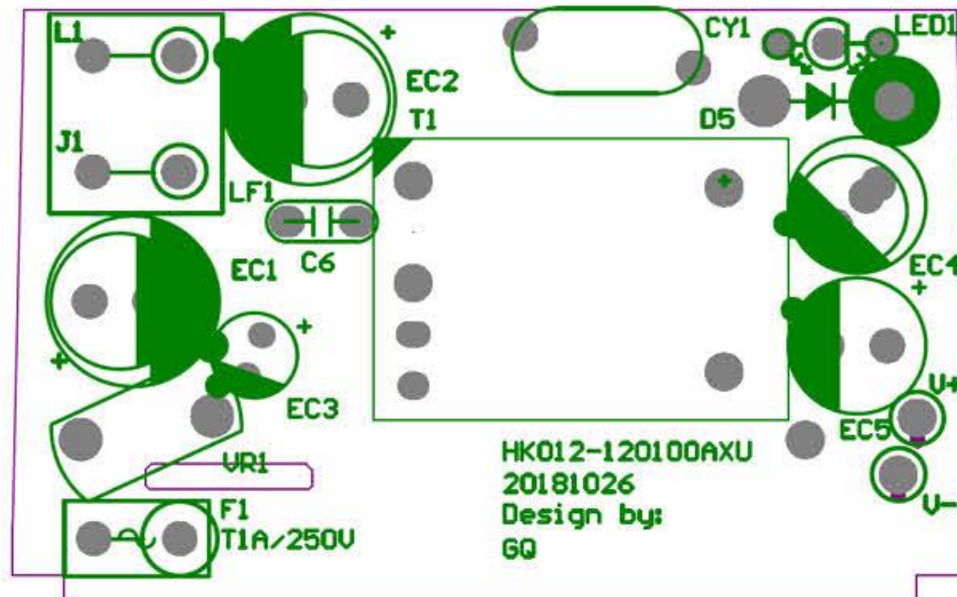


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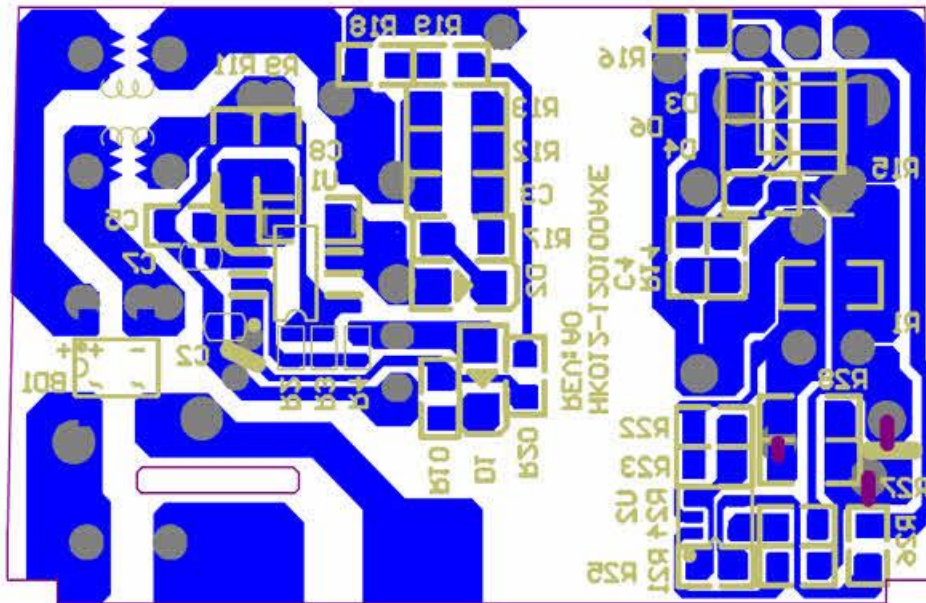
N191909078

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PCB 顶层



PCB 底层



佛山市顺德区乔晶电子有限公司

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TEL: 0757-28992178

陈生: 13825523385

FAX: 0757-28992177

林生: 13360353778

承 认 书

(SPECIFICATION FOR APPROVAL)

客 户			
CUSTOMER	茂硕电源		
产 品 名 称			
DESCRIPTION	滤波器		
客 户 料 号			
CUSTOMER SPART NO	306250010		
料 号			
SPART NO	QJ161375		
公司编号			
OUR DWG. NO	QJ-EE8.3-063		
页 码	版 本		
PAGE NO	1/5	EDITION	A ₀
送审日期			
CHECK DATE	2016-09-13		
承制方:	使用方:		
MANUFACTURER:	USER:		

拟 制	工 艺	审 核	品 质
DESCRIBED	TECHNOLOGY	CHECKED	QUALITY
严 匀 宏			

审 核	核 准
CHECKED	APPROVED

请在确认后, 返回该件副本, 正本请客户留档备案; 如果在签名的副本返回之前, 已接到该零件的订单, 则认为已通过认定。

Please return one copy of this drawing with your signaure of approval and retain, the others for your record in the evect order being placed for this part number; befor the signed copy is returned, it will be assumed that full appoval have been given

**佛山市顺德区乔晶电子有限公司**

QIAOJING ELECTRONIC CO., LTD SHUNDE DISTRICT, FOSHAN CITY

文件修订记录

客户 (CUSTOMER)	客户料号 (CUSTOMER SPART NO)		乔晶编号 (OUR DWG.NO)	乔晶料号 (SPART NO)	版本 (EDITION)
茂硕电源	306250010		QJ-EE8.3-063	QJ161375	A ₀
修订记录	发行日期	版本	变更内容		
	2016-09-13	A ₀	首次发行		

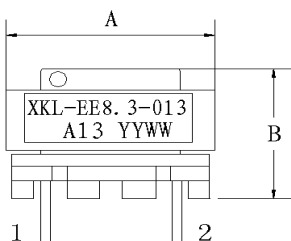
佛山市顺德区乔晶电子有限公司

地址: 佛山市顺德区容桂容里昌宝西路 39 号天富来国际工业城一期 2 座 2 楼

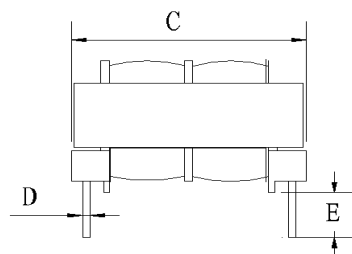
陈生: 13825523385 林生: 13360353778

客户 (CUSTOMER)	规格 (SPECIFICATION)	客户料号 (CUSTOMER SPART NO)
茂硕电源	EE8.3 滤波器	306250010
料号 (SPART NO)	公司编号 (OUR DWG. NO)	日期 (SIGNATURE DATE)
QJ161375	QJ-EE8.3-063	2016-09-13

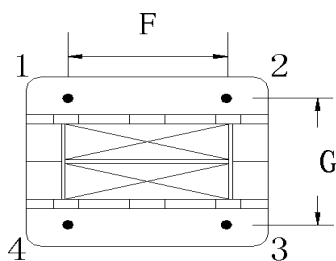
1、DIMENSION: UNIT: mm



主视图



侧视图



底视图

编号	尺寸说明
A	10.5MAX
B	10MAX
C	10.5MAX
D	0.5±0.1
E	3.5±0.3
F	5.0±0.3
G	6.8±0.5

备注:1. 磁芯用 4.0mm 黄色胶带包三层

2. 各绕组均密绕, 且圈数要相同

3. 标签为透明底黑字, 楷体, 尺寸为 7mm*3.5mm, 贴在 PIN1-2 侧

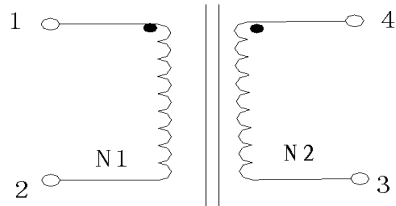
4. EE8.3 磁芯: AL≥3500

佛山市顺德区乔晶电子有限公司

地址：佛山市顺德区容桂容里昌宝西路 39 号天富来国际工业城一期 2 座 2 楼 陈生：13825523385 林生：13360353778

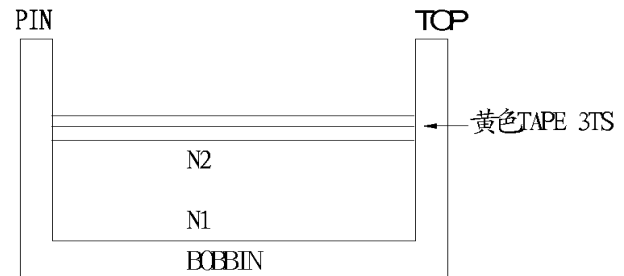
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茂硕电源	EE8.3 滤波器	306250010
料号 (SPART NO)	公司编号 (OUR DWG. NO)	日期 (SIGNATURE DATE)
QJ161375	QJ-EE8.3-063	2016-09-13

2. 1. SCHEMATIC:



● 表示同名端

PRI SEC



2. WINDING CONSTRUCTION

绕组	起始脚	圈数	线材	胶带	备注
N1	PIN1-2	80TS 参考	2UEW $\Phi 0.15\text{mm}$	4.8mm*3TS*黄色	密绕
N2	PIN4-3	80TS 参考	2UEW $\Phi 0.15\text{mm}$		密绕

3. ELECTRICAL SPECIFICATION

项目	测试点	参数要求	测试条件	测试设备
3.1. INDUCTANCE TEST	N1=N2	16mH MIN	AT 1KHZ 0.25V	MODEL 1062A 仪器内阻为 25 Ω
3.3. HI-POT TEST	N1-N2	1.5KV/AC	5mA/3S	MODEL 19053
	N1、N2-CORE	0.6KV/AC	5mA/3S	

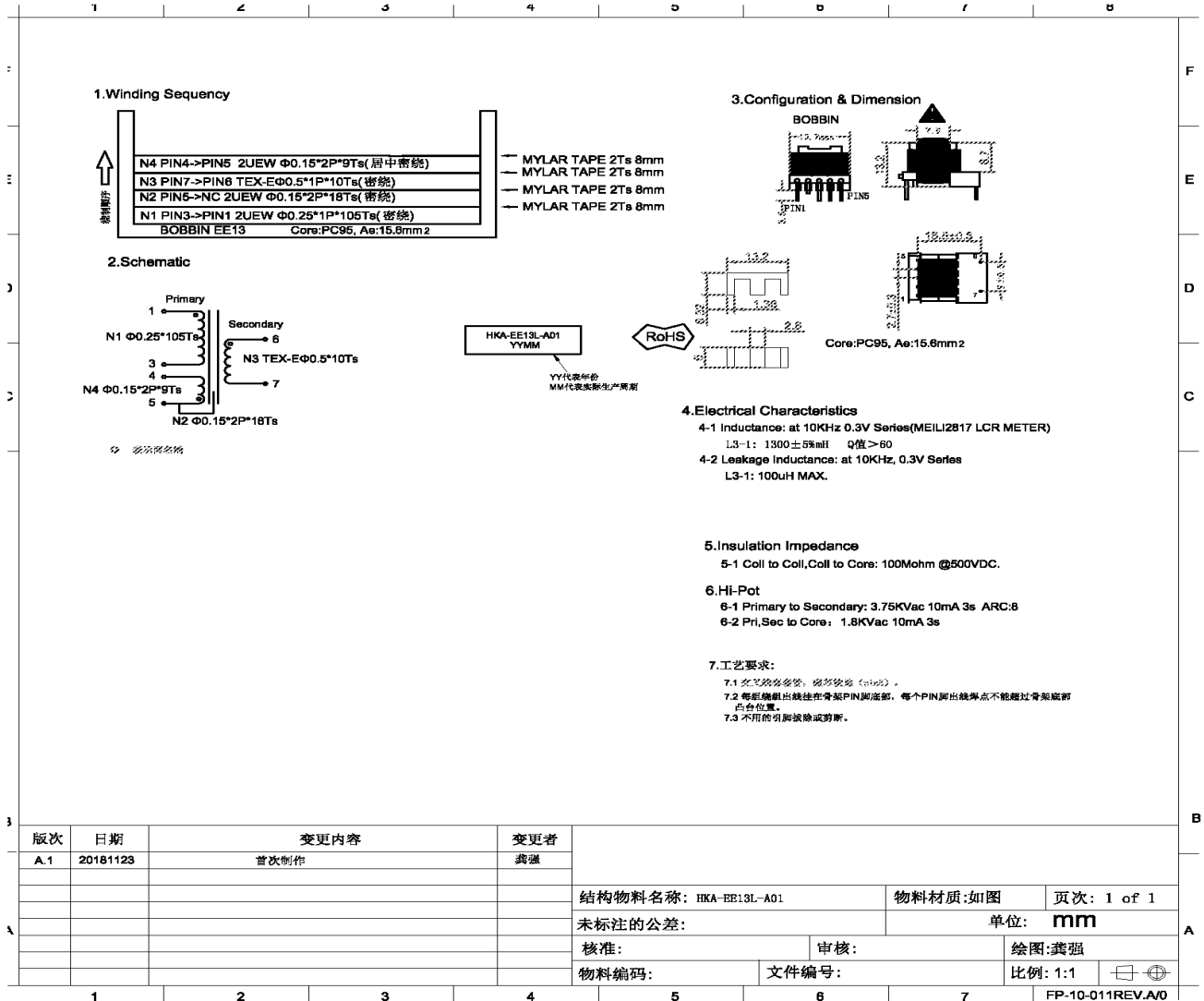
佛山市顺德区乔晶电子有限公司

地址: 佛山市顺德区容桂容里昌宝西路 39 号天富来国际工业城一期 2 座 2 楼 陈生: 13825523385 林生: 13360353778

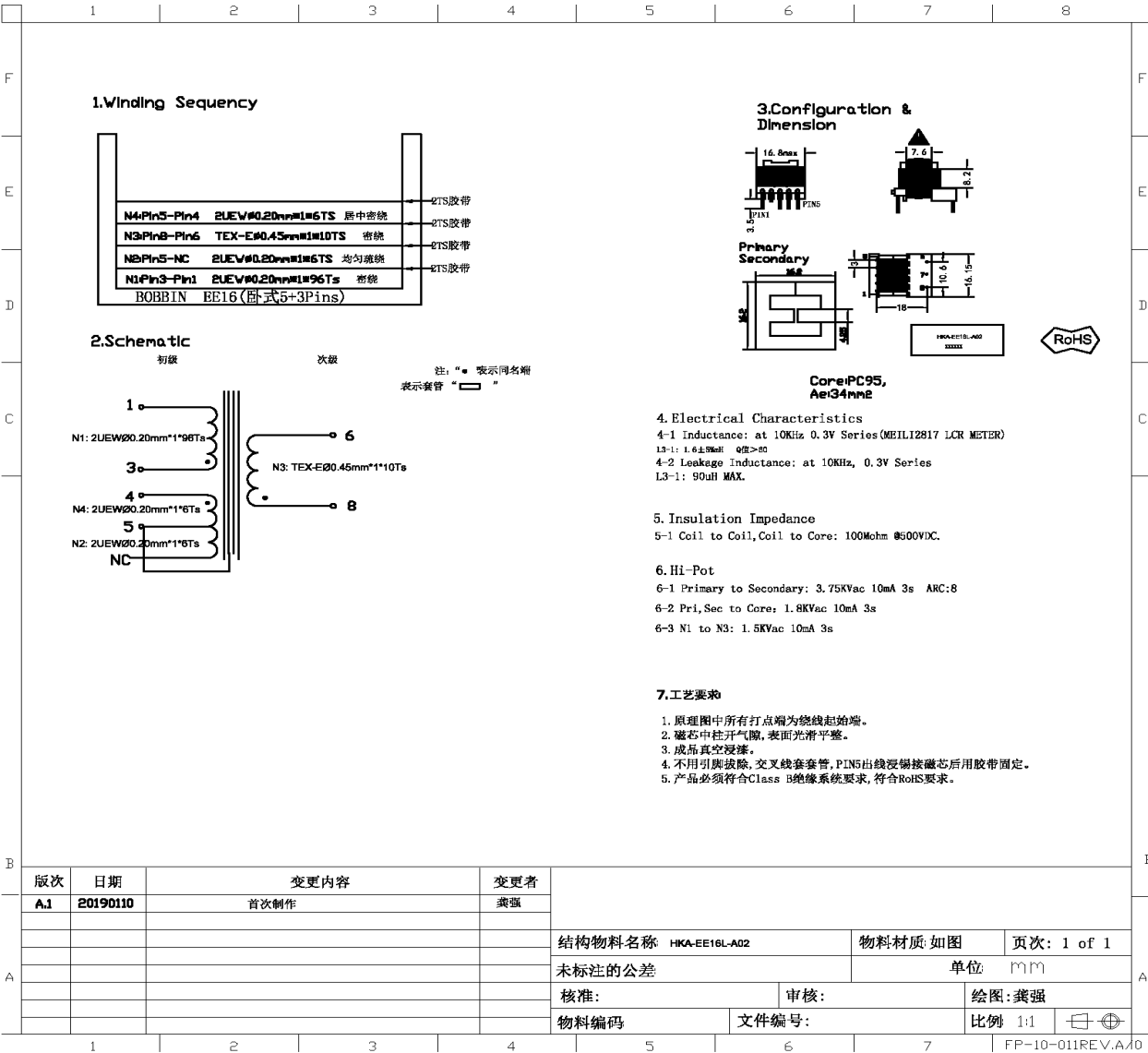
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茂硕电源	EE8. 3 滤波器	306250010
料号 (SPART NO)	公司编号 (OUR DWG. NO)	日期 (SIGNATURE DATE)
QJ161375	QJ-EE8. 3-063	2016-09-13

4. 1. MATERIALS LIST:

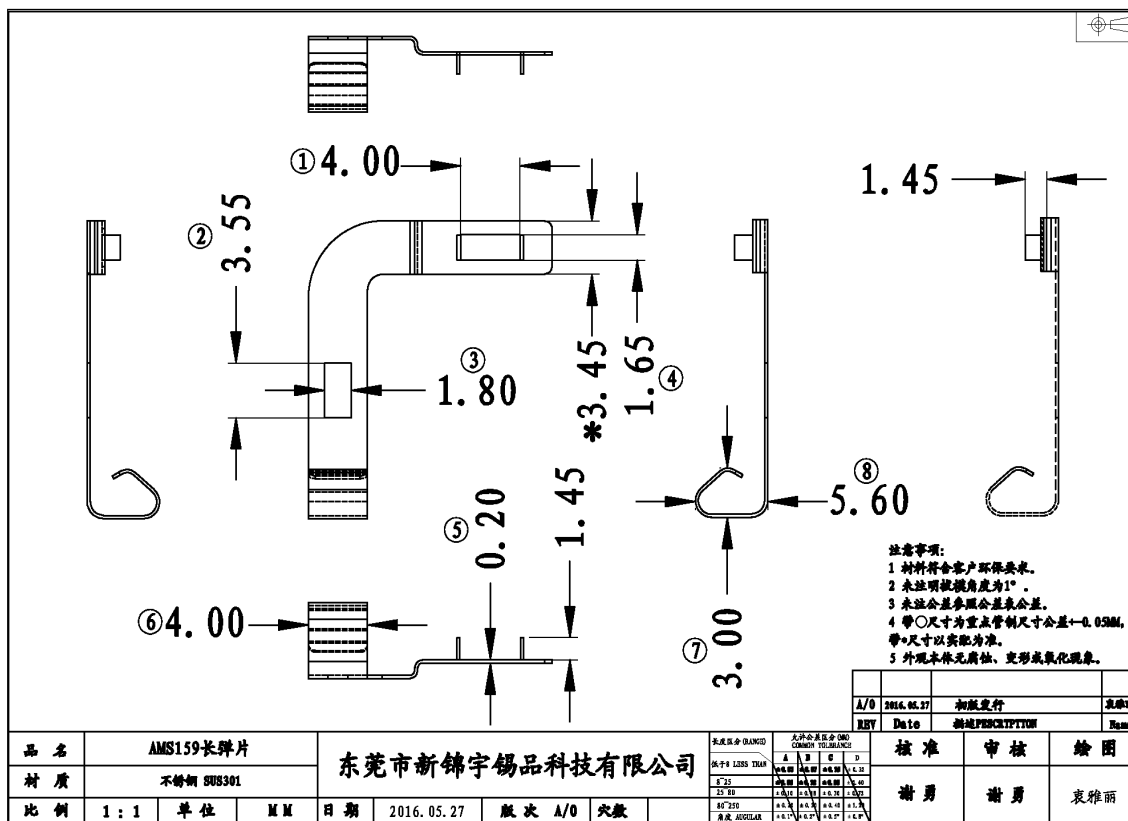
NO	ITEM	TYPE	SUPPLIERS	UL NO.
1	BOBBIN	TYPE:T375J/T373J MATERIAL: V-0.155 °C	CHANG CHUN PLASTICS CO., LTD.	E59481
2	CORE	TYPE: R10K EQUAL MATERIAL:EE8. 3	HAINING ZHONG XIN ELECTRONICS CO.,LTD	
3	WIRE	TYPE:UEW MW5-C THERMAL RATING:155 °C	JIANGXI GANYUE HENGXING ELECTRICAL MATERIAL CO LTD	E233255
4	TAPE	TYPE NO: THERMAL RATING:155 °C	SHENZHEN WEICHUANGDA PACKAGING MATERIALS CO.,LTD	E333581
5	VARNISH	TYPE:E962 MW28 MATERIAL:155 °C	ZHUHAI CHANGXIAN NEW MATERIALS TECHNOLOGY CO., LTD	E335405
6	TIN	TYPE: THERMAL RATING:155 °C	THOUSAND ISLAND METAL FOIL CO.,LTD	



N191909083



N191909086



N191909086

CERTIFICATE OF COMPLIANCE

Certificate Number 20190330-E504979
Report Reference E504979-20190318
Issue Date 2019-MARCH-30

Issued to: PINGHU CITY HONGKI ELECTRIC CO LTD
XINCANG TOWN
3F, NO. 309 TONGCHE ROAD
PINGHU, ZHEJIANG 314200 CHINA

This certificate confirms that representative samples of DIRECT-PLUG-IN AND CORD-CONNECTED CLASS 2 POWER UNITS

Refer to Addendum page for Models/Product

Have been investigated by UL in accordance with the Standard(s) indicated on this Certificate.

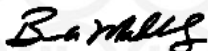
Standard(s) for Safety: UL 1310, Class 2 Power Units
CAN/CSA C22.2 No. 223, Power Supplies with Extra-low Voltage Class 2 Outputs

Additional Information: See the UL Online Certifications Directory at <https://iq.ulprospector.com> for additional information.

This *Certificate of Compliance* does not provide authorization to apply the UL Mark. Only the UL Follow-Up Services Procedure provides authorization to apply the UL Mark.

Only those products bearing the UL Mark should be considered as being UL Certified and covered under UL's Follow-Up Services.

Look for the UL Certification Mark on the product.



Bruce Mahrenholz, Director North American Certification Program

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CERTIFICATE OF COMPLIANCE

Certificate Number 20190330-E504979
Report Reference E504979-20190318
Issue Date 2019-MARCH-30

This is to certify that representative samples of the product as specified on this certificate were tested according to the current UL requirements.

Models/Product

USL, CNL – Class 2 Power Supply, Models HK003-006050AXU, HK003-006045AXU, HK003-006040AXU, HK003-006035AXU, HK003-006030AXU, HK003-005050AXU, HK003-005040AXU, HK012-120100AXU, HK012-120090AXU, HK012-120080AXU, HK012-120070AXU, HK012-120060AXU, HK012-120050AXU, HK012-060100AXU, HK012-060080AXU, HK012-060070AXU, HK012-060060AXU, HK012-050100AXU.



Bruce Mahrenholz, Director North American Certification Program

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File E504979
Project 4788798888

March 18, 2019

REPORT

On

DIRECT PLUG-IN AND CORD-CONNECTED CLASS 2 POWER UNITS

PINGHU CITY HONGKI ELECTRIC CO LTD
ZHEJIANG, CHINA

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DESCRIPTION

PRODUCT COVERED:

USL, CNL - Class 2 Power Supply, Models HK003-006050AXU, HK003-006045AXU, HK003-006040AXU, HK003-006035AXU, HK003-006030AXU, HK003-005050AXU, HK003-005040AXU, HK012-120100AXU, HK012-120090AXU, HK012-120080AXU, HK012-120070AXU, HK012-120060AXU, HK012-120050AXU, HK012-060100AXU, HK012-060080AXU, HK012-060070AXU, HK012-060060AXU, HK012-050100AXU.

GENERAL:

Each unit covered by this Report is a direct plug-in type Class 2 Power Supply.

Each unit consists of a switch mode transformer and other related electronic circuitry house in thermoplastic enclosure, and provide with non-polarized parallel blades for connection to line voltage.

Each unit does not include a grounding connection, and has no user accessible metal part which is likely to become energized. It is intended for dry location use only.

ELECTRICAL RATINGS:

Model	Input			Output		
	V ac	Hz	A	V dc	mA	W
HK003-006050AXU	100-120	50/60	0.2	6	500	3
HK003-006045AXU	100-120	50/60	0.2	6	450	2.7
HK003-006040AXU	100-120	50/60	0.2	6	400	2.4
HK003-006035AXU	100-120	50/60	0.2	6	350	2.1
HK003-006030AXU	100-120	50/60	0.2	6	300	1.8
HK003-005050AXU	100-120	50/60	0.2	5	500	2.5
HK003-005040AXU	100-120	50/60	0.2	5	400	2

Model	Input			Output		
	V ac	Hz	A	V dc	mA	W
HK012-120100AXU	100-120	50/60	0.3	12	1000	12
HK012-120090AXU	100-120	50/60	0.3	12	900	10.8
HK012-120080AXU	100-120	50/60	0.3	12	800	9.6
HK012-120070AXU	100-120	50/60	0.3	12	700	8.4
HK012-120060AXU	100-120	50/60	0.3	12	600	7.2
HK012-120050AXU	100-120	50/60	0.3	12	500	6
HK012-060100AXU	100-120	50/60	0.2	6	1000	6
HK012-060080AXU	100-120	50/60	0.2	6	800	4.8
HK012-060070AXU	100-120	50/60	0.2	6	700	4.2
HK012-060060AXU	100-120	50/60	0.2	6	600	3.6
HK012-050100AXU	100-120	50/60	0.2	5	1000	5

TECHNICAL CONSIDERATIONS (Not For Field Representative's Use):

USL indicates investigation to the U.S. Standard for Class 2 Power Units, UL 1310, Seventh Edition.

CNL indicates investigation to the Canadian Standard for Power Supplies with Extra-Low-Voltage Class 2 Outputs, CAN/CSA-C22.2 No. 223, Third Edition.

The maximum room ambient temperature is 25°C (Tmra).

This unit weights less than 1 pound (454g).

CONSTRUCTION DETAILS:

Section General - The following construction items are described in Section General.

Abbreviations	Date of Manufacturing
Corrosion Protection	Cautionary Markings
Segregation	Spacings
Blade Construction	Printed Wiring Board
Markings	

For CNL Unit, markings and instructions shall be provided in both English and French.

Markings - See Sec. Gen., Markings for detail. The following markings shall be additionally provided:

"Class 2 Power Supply"

"CAUTION - Risk of Electric Shock." and the following, "Do not expose to liquid, vapor, or rain" or "Dry location use only".

"ATTENTION : POUR UTILISATION A L'INTERIEUR SEULEMENT"



or

Illustrations - The following Illustration is referenced in this report:

ILL. No.	Description
1	Enclosure Construction
2	Drawing of Output Cord Strain Relief Bushing
3	PWB Component and Trace Layout for Models HK012 Series
4	PWB Component and Trace Layout for Models HK003 Series
5	LF1 Specification for Models HK012 Series
6	Transformer Construction and Insulation for Models HK003 Series
7	Transformer Construction and Insulation for Models HK012 Series (Output 6V dc and 5V dc)
8	Transformer Construction and Insulation for Models HK012 Series (Output 12V dc)
9	Size of dimensions of the Spring connectors

General - The general design, shape, and arrangement shall be as illustrated in the following figures, except where variations are specifically described.

CLASS 2 POWER SUPPLY, MODEL HK012-120100AXU - FIGS. 1
(ALSO REPRESENTS ALL SERIES COVERED UNDER THIS REPORT)

General - Figs. 1 represent the external view of Model HK012-120100AXU.

1. Enclosure - R/C (QMFZ2), SABIC INNOVATIVE PLASTICS B V (E45329), Type 943(f1), PC, AO color, rated V-0, HWI=3, HAI=3, 120°C, overall measures approx. 61.0 by 41.0 by 30.0 mm, minimum 1.5 mm thick. Two halves construction, secured together by ultrasonic welding. Provided with one opening for output cord strain relief, measures approx. 7.0 by 5.2 mm. See ILL. 1 for construction details.
2. Input Blades - Non-polarized, non-grounding type. Plated copper alloy, two provided. Each blade located minimum 7.3 mm from the edge of enclosure perimeter. See Section General, Blades for construction details and dimensions. Molded to Enclosure.
3. Output Cord Strain Relief Bushing - PVC bushing integrally molded on Output Cord and physically fitted in Enclosure. See ILL. 2 for construction details.
4. Output Cord - R/C (AVLV2/8), two-conductors, stranded, minimum 300 V, minimum 80 °C, minimum 26 AWG. Provided with minimum 0.33 mm thick PVC insulation on each lead. One end terminated internally on PWB by soldering and mechanically secured before soldering. The other end terminated in a non-standard polarized output connector. Minimum 1.8 m external length. Provided with molded-on strain relief.
5. Input Contacts - Two spring connectors, stainless steel, min. 0.2 mm thick. See ILL. 9 for construction.

CLASS 2 POWER SUPPLY, MODELS HK003-006050AXU - FIGS. 2 AND 3
(ALSO REPRESENTS ALL MODELS HK003 SERIES COVERED UNDER THIS REPORT)

General - Figs. 2 and 3 show the internal views of Model HK003-006050AXU.

1. Printed Wiring Board (PWB) - R/C (ZPMV2), rated minimum 130°C, V-1. Minimum 1.2 mm thick, overall approx. 55.0 by 35.0 mm. See ILL. 4 for component and trace layouts.
2. Fuse (F1) - R/C (JDYX2/8), DONGGUAN BETTER ELECTRONICS TECHNOLOGY CO LTD (E300003), Type 932, non-time-delay type, rated 250 Vac, 1 A.
3. Bridge Diode (BD1) - Rated minimum 1.0 A, minimum 1000 V. Secured on PWB by soldering.
4. Capacitors (EC1, EC2) - Electrolytic with integral pressure relief. Rated 400 V, 4.7 uF, minimum 105°C.
5. Capacitor (EC3) - Electrolytic with integral pressure relief. Rated 50 V, 4.7 uF, minimum 105°C.
6. Capacitors (EC4, EC5) - Electrolytic with integral pressure relief. Rated 25 V, 220 uF, minimum 105°C for Capacitor EC4. Capacitor EC5 is not provided.
7. IC (U1) - Manufactured by MIX-DESIGN, Type MD1801.
8. Current Sensor Resistors (R4, R6) - Each rated min. 1 ohm, minimum 1/4 W. Secured on PWB by soldering.
9. Y-Capacitor (CY1) - R/C (FOWX2/8), rated maximum 1000 pF, minimum 250 Vac, Y1 Type, 125°C. Following types may be used.

Manufacturer / File No.	Type
SHANTOU HIGH-NEW TECHNOLOGY DEVELOPMNT ZONE SONGTIAN ENTERPRISE CO LTD (E208107)	CD
JYA-NAY CO LTD (E201384)	JN
SUCCESS ELECTRONICS CO LTD (E114280)	SE

10. Diodes (D3, D4) - Rated minimum 60 V, minimum 2.0 A.
11. Inductor (L1) - Rated 2.2 mH.
12. Transformer (T1) - Employed R/C (OBJY2), BILLION ELECTRIC CO LTD (E150529), Class 130 (B) electrical insulation systems, designated HIS-8A, Table I. See ILL. 6 for Transformer overall view. Transformer construction and Insulation. Constructed as below:
 - A. Core - Ferrite, E-E construction, overall measures 15.0 mm by 13.5 mm by 6.5 mm width, wrapped by two layers of Insulation Tape, each 0.05 mm thick, 6.0 mm width. Core is considered as primary part.

- B. Bobbin - R/C (QMFZ2), HITACHI CHEMICAL CO LTD (E42956), Type CP-J-8800, Phenolic, black or brown in color, rated V-0, 150 °C, measure minimum 0.64 mm thick.
- C. Primary Windings (N1, N2, N4) - R/C (OBMW2), rated minimum 130°C, various ANSI Types covered in Insulation System,, see ILL. 6 for Windings Information details.
- D. Secondary Winding (N3) - R/C (OBJT2), FURUKAWA ELECTRIC CO LTD (E206440), Type TEX-E, rated 130 °C, see ILL. 6 for Windings Information details.
- E. Insulation Tape - R/C (OANZ2), 3M COMPANY ELECTRICAL MARKETS DIV (EMD) (E17385), Type 1350F-1 or 1350F-2, all color, rated 130 °C, 0.05 mm thick per layer.
- F. Varnish - R/C (OBOR2), HITACHI CHEMICAL CO LTD (E72979), Type WA-238A, rated min. 130°C.
- G. Tube - R/C (YDPU2), ZEUS INDUSTRIAL PRODUCTS INC (E64007), not heat-shrinkable PTFE tubing, Type TFE-TW-300, rated minimum 300 V, 200°C.
- H. Primary Crossover Lead insulation - Two layers of insulation tape and tube.
- I. Transformer insulation provided as follows:

Location	Material	Layers	Single layer Thick (mm)
Outer-wrap	Insulation Tape	2	Min. 0.05
N4 to N3	Insulation Tape	2	Min. 0.05
N3 to N2	Insulation Tape	2	Min. 0.05
N2 to N1	Insulation Tape	2	Min. 0.05
N1 to Core	Bobbin	-	Min. 0.64

13. Varistor (VR1) - Not provided.

CLASS 2 POWER SUPPLY, MODELS HK012-120100AXU - FIGS. 4 AND 5
(ALSO REPRESENTS ALL MODELS HK012 SERIES COVERED UNDER THIS REPORT)

General - Figs. 4 and 5 show the internal views of Model HK012-120100AXU.

1. Printed Wiring Board (PWB) - R/C (ZPMV2), rated minimum 130°C, V-1. Minimum 1.2 mm thick, overall approx. 55.0 by 35.0 mm. See ILL. 3 for component and trace layouts.
2. Fuse (F1) - R/C (JDYX2/8), DONGGUAN BETTER ELECTRONICS TECHNOLOGY CO LTD (E300003), Type 932, non-time-delay type, rated 250 Vac, 1 A.
3. Bridge Diode (BD1) - Rated minimum 1.0 A, minimum 1000 V. Secured on PWB by soldering.
4. Capacitors (EC1, EC2) - Electrolytic with integral pressure relief. Rated 400 V, 10 uF, minimum 105°C.
5. Capacitor (EC3) - Electrolytic with integral pressure relief. Rated 50 V, 4.7 uF, minimum 105°C.
6. Capacitors (EC4, EC5) - Electrolytic with integral pressure relief. Rated 16 V, 470 uF, minimum 105°C for Capacitor EC4. Capacitor EC5 is not provided.
7. IC (U1) - Manufactured by MIX-DESIGN, Type MC1109.
8. Current Sensor Resistors (R9, R11) - Each rated min. 1 ohm, minimum 1/4 W. Secured on PWB by soldering.
9. Y-Capacitor (CY1) - R/C (FOWX2/8), rated maximum 1000 pF, minimum 250 Vac, Y1 Type, 125°C. Following types may be used.

Manufacturer / File No.	Type
SHANTOU HIGH-NEW TECHNOLOGY DEVELOPMNT ZONE SONGTIAN ENTERPRISE CO LTD (E208107)	CD
JYA-NAY CO LTD (E201384)	JN
SUCCESS ELECTRONICS CO LTD (E114280)	SE

10. Diodes (D3, D4) - Rated minimum 60 V, minimum 2.0 A.
11. Inductor (L1) - For Models output 6V dc and 5V dc, Rated 2.2 mH.
12. Line Choke (LF1) - For Models output 12V dc, rated minimum 16 mH. See ILL. 5 for construction details. Constructed as below:
 - a. Core - Ferrite, overall size: 9.2 mm by 9.2 mm by 3.8 mm.
 - b. Bobbin - R/C (QMFZ2), CHANG CHUN PLASTICS CO LTD (E59481), Type T375J, Phenolic, black or brown in color, rated V-0, 150 °C, measure minimum 0.64 mm thick.

- c. Windings - R/C (OBMW2), rated 130°C, each winding diameter 0.15 mm by 80 turns.

The spacing between two windings is minimum 1.6 mm.

- d. Insulation Tape - R/C (OANZ2), 3M COMPANY ELECTRICAL MARKETS DIV (EMD) (E17385), Type 1350F-1(b) or 1350F-2(c), all color, rated 130 °C, 0.05 mm thick per layer.

- e. Varnish - R/C (OBOR2), rated min. 130 °C.

- 12. Transformer (T1) - For Models output 6V dc and 5V dc. Employed R/C (OBJY2), BILLION ELECTRIC CO LTD (E150529), Class 130 (B) electrical insulation systems, designated HIS-8A, Table I. See ILL. 7 for Transformer overall view. Transformer construction and Insulation. Constructed as below:

- A. Core - Ferrite, E-E construction, overall measures 17.5 mm by 15.2 mm by 7.8 mm width, wrapped by three layers of Insulation Tape, each 0.05 mm thick, 8.0 mm width. Core is considered as primary part.
- B. Bobbin - R/C (QMFZ2), HITACHI CHEMICAL CO LTD (E42956), Type CP-J-8800, Phenolic, black or brown in color, rated V-0, 150 °C, measure minimum 0.64 mm thick.
- C. Primary Windings (N1, N2, N4) - R/C (OBMW2), rated minimum 130°C, various ANSI Types covered in Insulation System,, see ILL. 7 for Windings Information details.
- D. Secondary Winding (N3) - R/C (OBJT2), FURUKAWA ELECTRIC CO LTD (E206440), Type TEX-E, rated 130 °C, see ILL. 7 for Windings Information details.
- E. Insulation Tape - R/C (OANZ2), 3M COMPANY ELECTRICAL MARKETS DIV (EMD) (E17385), Type 1350F-1 or 1350F-2, all color, rated 130 °C, 0.05 mm thick per layer.
- F. Varnish - R/C (OBOR2), HITACHI CHEMICAL CO LTD (E72979), Type WA-238A, rated min. 130°C.
- G. Tube - R/C (YDPU2), ZEUS INDUSTRIAL PRODUCTS INC (E64007), not heat-shrinkable PTFE tubing, Type TFE-TW-300, rated minimum 300 V, 200°C.
- H. Primary Crossover Lead insulation - Two layers of insulation tape and tube.
- I. Transformer insulation provided as follows:

Location	Material	Layers	Single layer Thick (mm)
Outer-wrap	Insulation Tape	2	Min. 0.05
N4 to N3	Insulation Tape	2	Min. 0.05
N3 to N2	Insulation Tape	2	Min. 0.05
N2 to N1	Insulation Tape	2	Min. 0.05
N1 to Core	Bobbin	-	Min. 0.64

13. Transformer (T1) - For Models output 12V dc. Employed R/C (OBJY2), BILLION ELECTRIC CO LTD (E150529), Class 130 (B) electrical insulation systems, designated HIS-8A, Table I. See ILL. 8 for Transformer overall view. Transformer construction and Insulation. Constructed as below:

- A. Core - Ferrite, E-E construction, overall measures 17.5 mm by 15.2 mm by 7.8 mm width, wrapped by two layers of Insulation Tape, each 0.05 mm thick, 8.0 mm width. Core is considered as primary part.
- B. Bobbin - R/C (QMFZ2), HITACHI CHEMICAL CO LTD (E42956), Type CP-J-8800, Phenolic, black or brown in color, rated V-0, 150 °C, measure minimum 0.64 mm thick.
- C. Primary Windings (N1, N2, N4) - R/C (OBMW2), rated minimum 130°C, various ANSI Types covered in Insulation System,, see ILL. 8 for Windings Information details.
- D. Secondary Winding (N3) - R/C (OBJT2), FURUKAWA ELECTRIC CO LTD (E206440), Type TEX-E, rated 130 °C, see ILL. 8 for Windings Information details.
- E. Insulation Tape - R/C (OANZ2), 3M COMPANY ELECTRICAL MARKETS DIV (EMD) (E17385), Type 1350F-1 or 1350F-2, all color, rated 130 °C, 0.05 mm thick per layer.
- F. Varnish - R/C (OBOR2), HITACHI CHEMICAL CO LTD (E72979), Type WA-238A, rated min. 130°C.
- G. Tube - R/C (YDPU2), ZEUS INDUSTRIAL PRODUCTS INC (E64007), not heat-shrinkable PTFE tubing, Type TFE-TW-300, rated minimum 300 V, 200°C.
- H. Primary Crossover Lead insulation - Two layers of insulation tape and tube.

I. Transformer insulation provided as follows:

Location	Material	Layers	Single layer Thick (mm)
Outer-wrap	Insulation Tape	2	Min. 0.05
N4 to N3	Insulation Tape	2	Min. 0.05
N3 to N2	Insulation Tape	2	Min. 0.05
N2 to N1	Insulation Tape	2	Min. 0.05
N1 to Core	Bobbin	-	Min. 0.64

14. Varistor (VR1) - Not provided.



N191909072



N191909073



N191909074



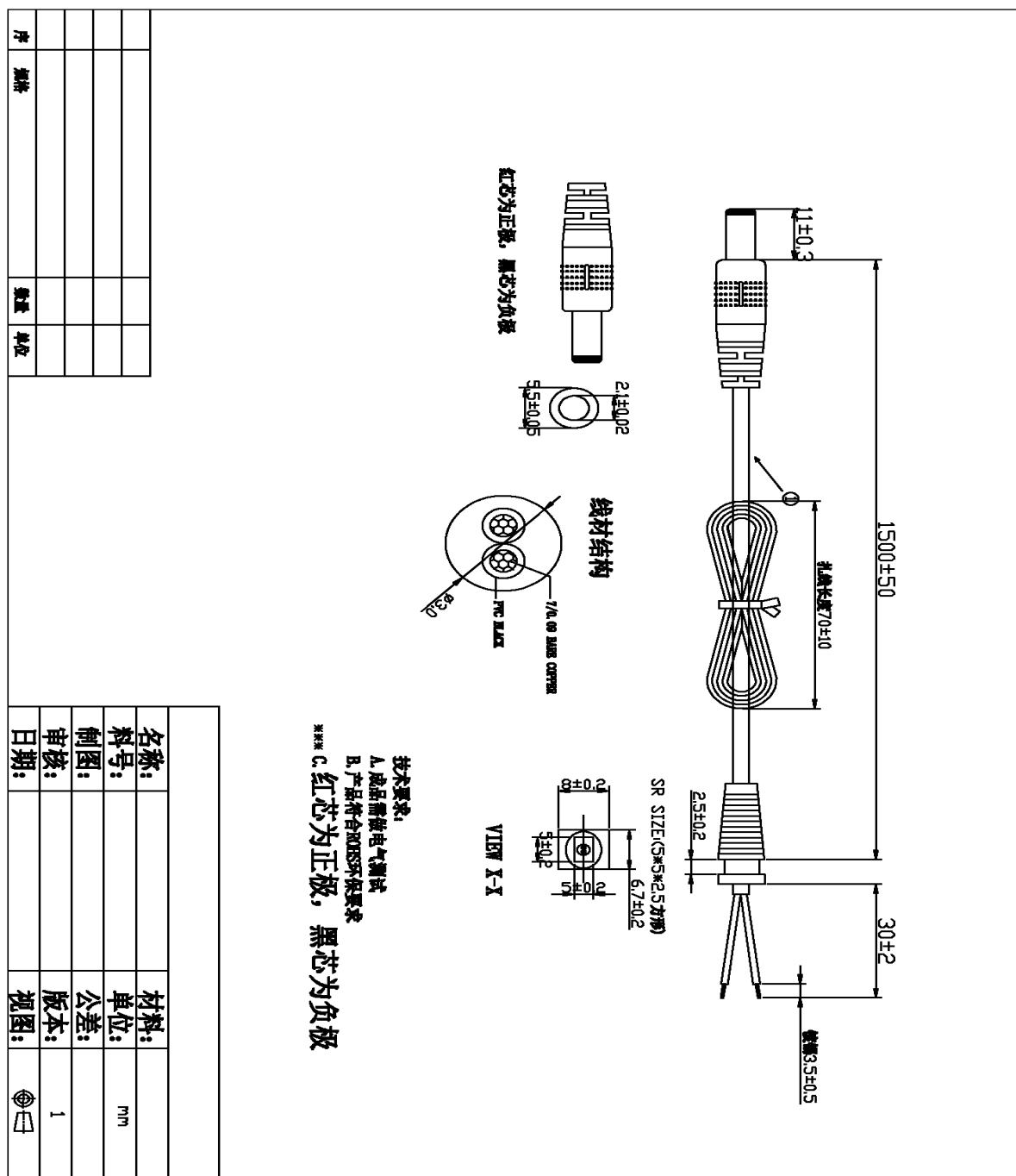
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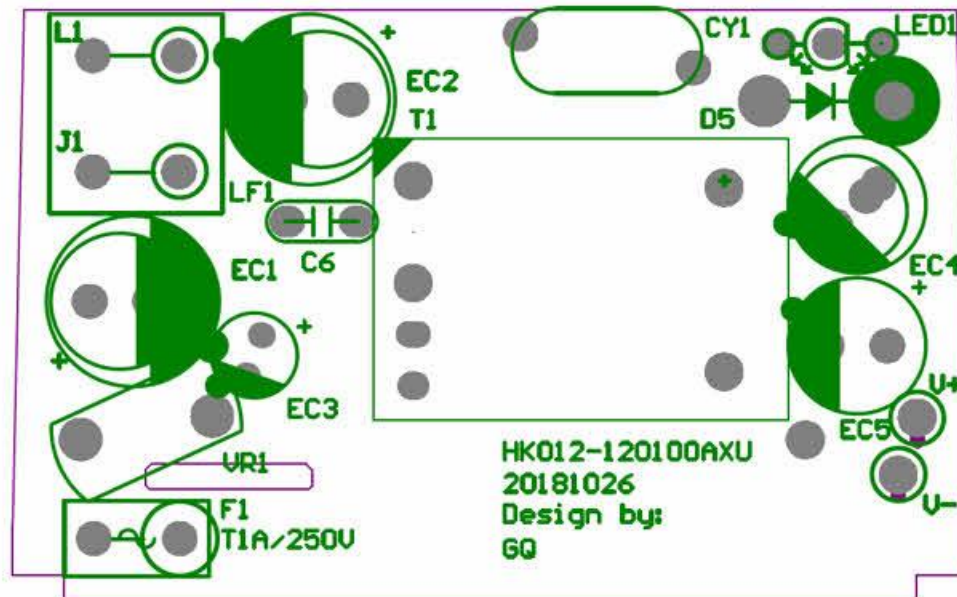


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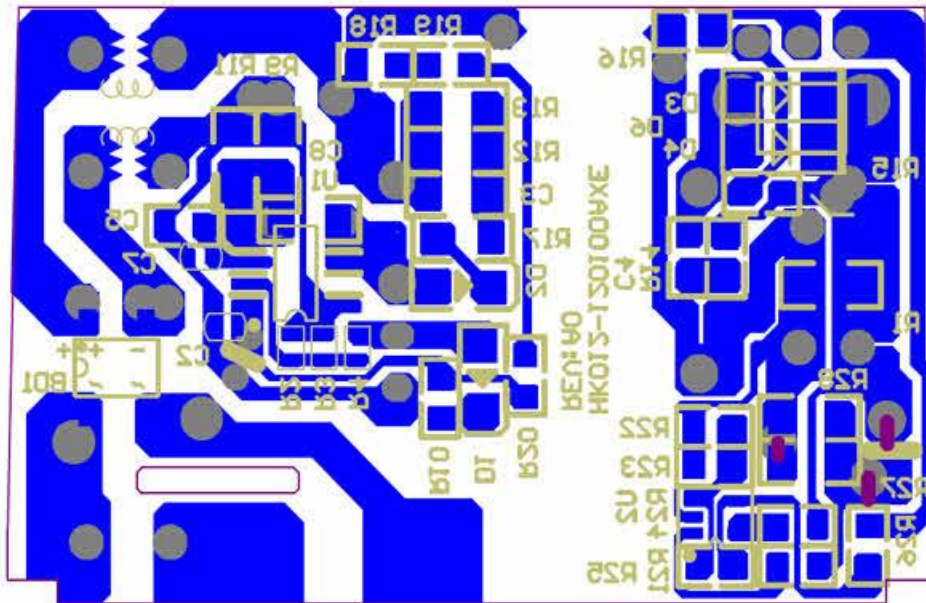
N191909078

N191909078

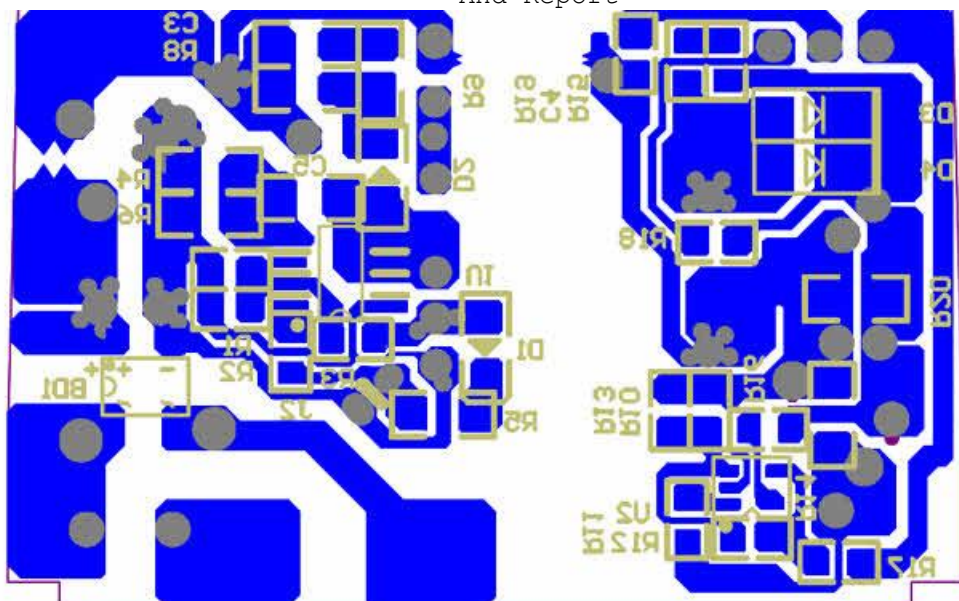




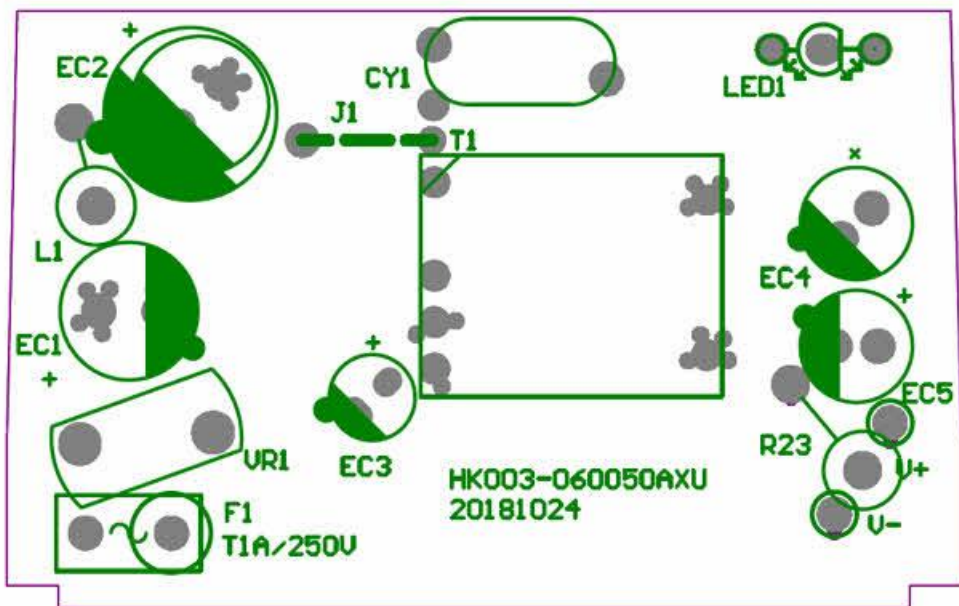
PCB 顶层



PCB 底层



PCB 底层



PCB 顶层

N191909081



佛山市顺德区乔晶电子有限公司

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TEL: 0757-28992178

陈生: 13825523385

FAX: 0757-28992177

林生: 13360353778

承 认 书

(SPECIFICATION FOR APPROVAL)

客 户			
CUSTOMER	茂硕电源		
产 品 名 称			
DESCRIPTION	滤波器		
客 户 料 号			
CUSTOMER SPART NO	306250010		
料 号			
SPART NO	QJ161375		
公司编号			
OUR DWG. NO	QJ-EE8.3-063		
页 码	版 本		
PAGE NO	1/5	EDITION	A ₀
送审日期			
CHECK DATE	2016-09-13		
承制方:	使用方:		
MANUFACTURER:	USER:		

拟 制	工 艺	审 核	品 质
DESCRIBED	TECHNOLOGY	CHECKED	QUALITY
严 匀 宏			

审 核	核 准
CHECKED	APPROVED

请在确认后, 返回该件副本, 正本请客户留档备案; 如果在签名的副本返回之前, 已接到该零件的订单, 则认为已通过认定。

Please return one copy of this drawing with your signaure of approval and retain, the others for your record in the evect order being placed for this part number; befor the signed copy is returned, it will be assumed that full appoval have been given

N191909082

**佛山市顺德区乔晶电子有限公司**

QIAOJING ELECTRONIC CO., LTD SHUNDE DISTRICT, FOSHAN CITY

文件修订记录

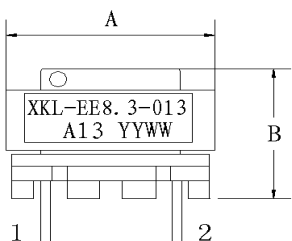
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茂硕电源	306250010		QJ-EE8.3-063	QJ161375	A ₀
修订记录	发行日期	版本	变更内容		
	2016-09-13	A ₀	首次发行		

佛山市顺德区乔晶电子有限公司

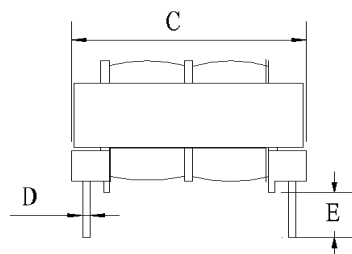
地址: 佛山市顺德区容桂容里昌宝西路 39 号天富来国际工业城一期 2 座 2 楼 陈生: 13825523385 林生: 13360353778

客户 (CUSTOMER)	规格 (SPECIFICATION)	客户料号 (CUSTOMER SPART NO)
茂硕电源	EE8.3 滤波器	306250010
料号 (SPART NO)	公司编号 (OUR DWG. NO)	日期 (SIGNATURE DATE)
QJ161375	QJ-EE8.3-063	2016-09-13

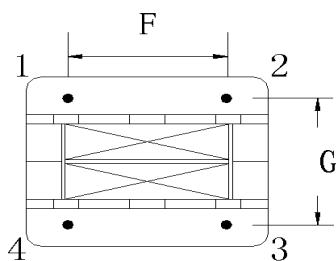
1、DIMENSION: UNIT: mm



主视图



侧视图



底视图

编号	尺寸说明
A	10.5MAX
B	10MAX
C	10.5MAX
D	0.5±0.1
E	3.5±0.3
F	5.0±0.3
G	6.8±0.5

备注:1. 磁芯用 4.0mm 黄色胶带包三层

2. 各绕组均密绕, 且圈数要相同

3. 标签为透明底黑字, 楷体, 尺寸为 7mm*3.5mm, 贴在 PIN1-2 侧

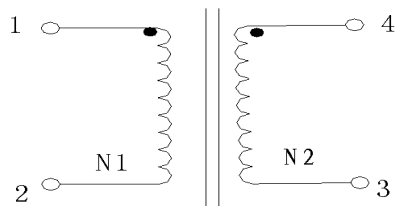
4. EE8.3 磁芯: AL≥3500

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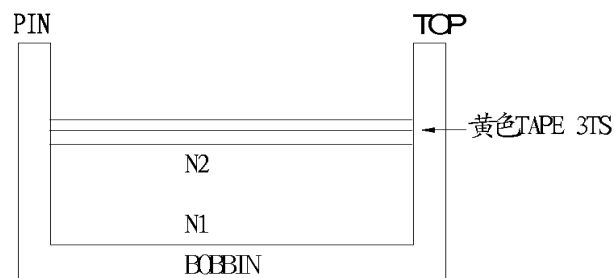
客户 (CUSTOMER)	规格 (SPECIFICATION)	客户料号 (CUSTOMER SPART NO)
茂硕电源	EE8.3 滤波器	306250010
料号 (SPART NO)	公司编号 (OUR DWG. NO)	日期 (SIGNATURE DATE)
QJ161375	QJ-EE8.3-063	2016-09-13

2. 1. SCHEMATIC:



• 表示同名端

PRI SEC



2. WINDING CONSTRUCTION

绕组	起始脚	圈数	线材	胶带	备注
N1	PIN1-2	80TS 参考	2UEW $\Phi 0.15\text{mm}$	4.8mm*3TS*黄色	密绕
N2	PIN4-3	80TS 参考	2UEW $\Phi 0.15\text{mm}$		密绕

3. ELECTRICAL SPECIFICATION

项目	测试点	参数要求	测试条件	测试设备
3.1. INDUCTANCE TEST	N1=N2	16mH MIN	AT 1KHZ 0.25V	MODEL 1062A 仪器内阻为 25 Ω
3.3. HI-POT TEST	N1-N2	1.5KV/AC	5mA/3S	MODEL 19053
	N1、N2-CORE	0.6KV/AC	5mA/3S	

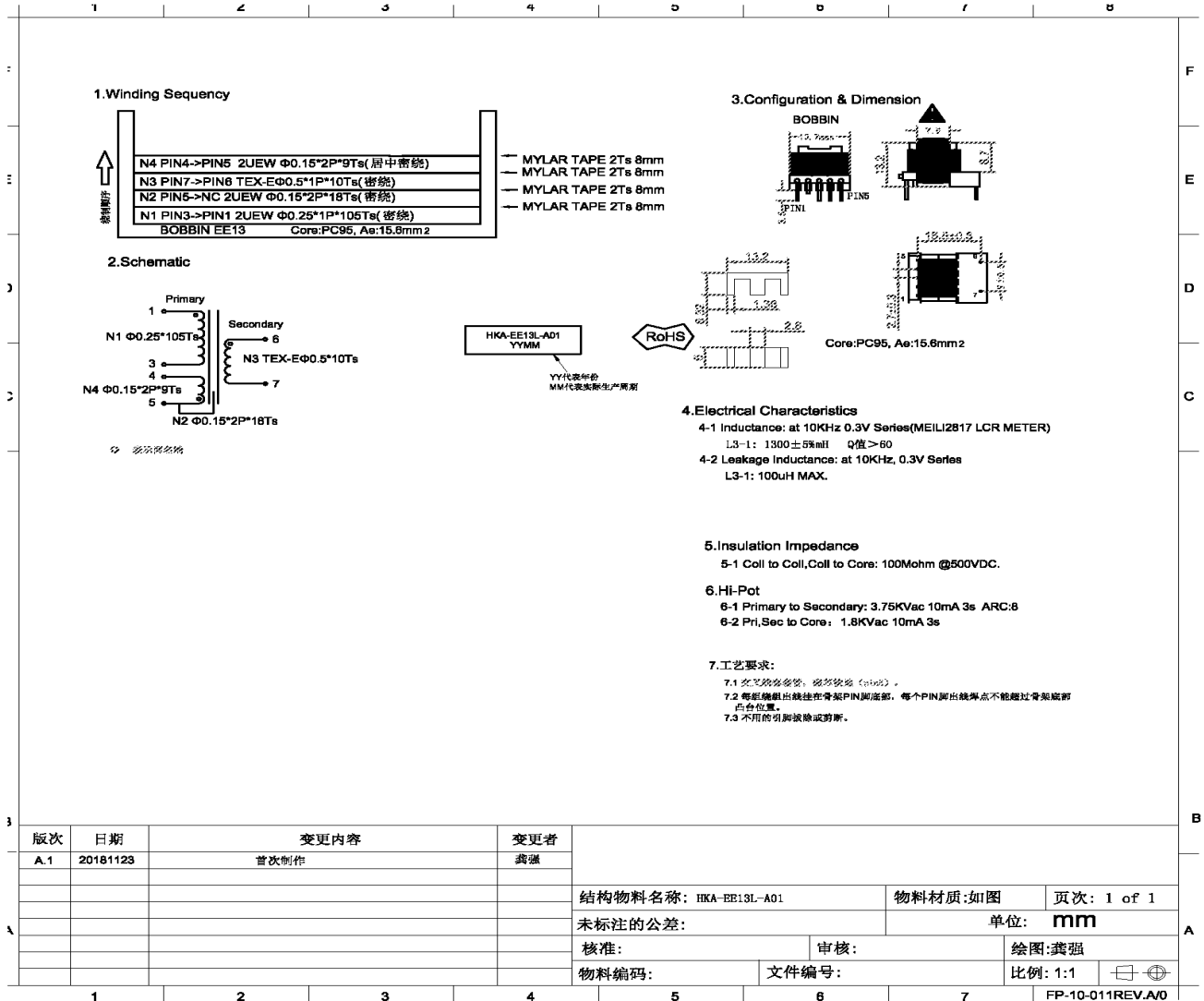
佛山市顺德区乔晶电子有限公司

地址: 佛山市顺德区容桂容里昌宝西路 39 号天富来国际工业城一期 2 座 2 楼 陈生: 13825523385 林生: 13360353778

客户 (CUSTOMER)	规格 (SPECIFICATION)	客户料号 (CUSTOMER SPART NO)
茂硕电源	EE8. 3 滤波器	306250010
料号 (SPART NO)	公司编号 (OUR DWG. NO)	日期 (SIGNATURE DATE)
QJ161375	QJ-EE8. 3-063	2016-09-13

4. 1. MATERIALS LIST:

NO	ITEM	TYPE	SUPPLIERS	UL NO.
1	BOBBIN	TYPE:T375J/T373J MATERIAL: V-0.155℃	CHANG CHUN PLASTICS CO., LTD.	E59481
2	CORE	TYPE: R10K EQUAL MATERIAL: EE8. 3	HAINING ZHONG XIN ELECTRONICS CO., LTD	
3	WIRE	TYPE: UEW MW5-C THERMAL RATING: 155℃	JIANGXI GANYUE HENGXING ELECTRICAL MATERIAL CO LTD	E233255
4	TAPE	TYPE NO: THERMAL RATING: 155℃	SHENZHEN WEICHUANGDA PACKAGING MATERIALS CO., LTD	E333581
5	VARNISH	TYPE: E962 MW28 MATERIAL: 155℃	ZHUHAI CHANGXIAN NEW MATERIALS TECHNOLOGY CO., LTD	E335405
6	TIN	TYPE: THERMAL RATING: 155℃	THOUSAND ISLAND METAL FOIL CO., LTD	



N191909083

N191909086

N191909086

TEST RECORD NO. 1

SAMPLES:

Samples of the Class 2 Power Supply, Models HK003-XXXXYYXAXU series, HK012-XXXXYYXAXU series, constructed as described herein, were submitted by the manufacturer and subjected to the following tests with the requirements in the Standard for Class 2 Power Units, UL 1310, Seventh Edition and the Canadian Standard for Power Supplies with Extra Low Voltage Class 2 Outputs, CAN/CSA C22.2 No. 223, Third Edition.

GENERAL:

Test results relate only to the items tested.

Tests on Model HK003-006050AXU represent for maximum output current and maximum power for Models HK003-XXXXYYXAXU series. Models HK012-120100AXU and HK012-060100AXU represent for maximum output current and maximum power for Models HK012-XXXXYYXAXU series with different transformers.

Mechanical tests performed on Model HK012-060100AXU were considered to represent other models due to the same enclosure construction.

The following tests were conducted in accordance with UL 1310 and Canadian Standard, CAN/CSA C22.2 No. 223 with acceptable results. Clause and paragraph reference conventions consist of UL 1310 reference followed by (C22.2 No. 223) reference.

Working Voltage Measurements	24.2
(Electrical Spacings, CSA C22.2 No. 223)	(4.11)
Leakage Current Test	26 (6.6)
Dielectric Voltage Withstand Test After Leakage Current Test	27
Leakage Current Test After Humidity Exposure	27
Dielectric Voltage Withstand Test After Humidity Exposure	27
Maximum Output Voltage Test	28
(Open-Circuit Secondary Voltage, CSA C22.2 No.223)	(6.3.1)
Normal Input Test	50.2
(Rated Input, CSA C22.2 No.223)	(6.3.2)
Maximum Input Test	29
(Rated Input, CSA C22.2 No. 223)	(6.3.2)
Output Current And Power Test (5 S)	30
(Maximum Output Current And Power, CSA C22.2 No.223)	(6.3.4)

Table CONT'D

Dielectric Voltage Withstand Test After Output Current And Power Test	34
(Dielectric Strength, CSA C22.2 No. 223)	(6.5)
Full-Load Output Current Test	32
Normal Temperature Test - General	33
(Temperature (Normal), CSA C22.2 No. 223)	(6.4)
Dielectric Voltage Withstand Test	34
(Dielectric Strength, CSA C22.2 No.223)	(6.5)
Output Loading Test - Abnormal	39.2, 39.3
(Secondary Circuit Protection, CSA C22.2 No. 223)	(6.7)
Dielectric Voltage Withstand Test After Output Loading Test	34
(Dielectric Strength, CSA C22.2 No. 223)	(6.5)
Transformer Burnout Test (Switch Mode Designs) - Abnormal	39.4
Dielectric Voltage Withstand Test After Transformer Burnout Test	34
Component Breakdown Test - Abnormal	39.7
(Abnormal, CSA C22.2 No. 223)	(6.8)
Dielectric Voltage Withstand Test After Component Breakdown Test	34
(Dielectric Strength, CSA C22.2 No. 223)	(6.5)
Printed Wiring Board Abnormal Operation Test - Abnormal	39.8
(Abnormal, CSA C22.2 No. 223)	(6.8)
Dielectric Voltage Withstand Test After Printed Wiring Board Abnormal Operation Test	34
(Dielectric Strength, CSA C22.2 No. 223)	(6.5)

Table CONT'D

Transformer Insulating Materials Test	40
(Insulating Material, CSA C22.2 No. 223)	(6.14)
Strain Relief Test	41
(Strain Relief And Blade Retention, CSA C22.2 No. 223)	(6.10)
Push-Back Relief Test	42
(Strain Relief And Blade Retention, CSA C22.2 No. 223)	(4.13.2)
Blade Secureness Test	43
(Strain Relief And Blade Retention, CSA C22.2 No. 223)	(6.10)
Input Contact Security Test	44
(Strain Relief And Blade Retention, CSA C22.2 No. 223)	(6.10)
Impact Test	46.2
(Drop And Impact Test, CSA C22.2 No. 223)	(6.9)
Dielectric Voltage Withstand Test After Impact Test	34
(Dielectric Strength, CSA C22.2 No. 223)	(6.5)
Rod Pressure Test	46.4
CSA C22.2 No. 223, Compression (Rod)	(6.15)
Dielectric Voltage Withstand Test (After Rod Pressure Test)	34
(Dielectric Strength, CSA C22.2 No. 223)	(6.5)
Resistance To Crushing Test	46.5
Mold Stress Relief Distortion Test	Table 25.1
(Deformation (Non-Metallic Enclosure))	(6.16)
Strain Relief Test After Mold Stress Relief Distortion Test	Table 25.1
(Strain Relief Test After Deformation, CSA C22.2 No. 223)	(6.16)
Weight And Moment Determination	7.11
(Construction - General, CSA C22.2 No.223)	(4.2.5)

The test methods and results of the above tests have been reviewed and found in accordance with the requirements in the Standards mentioned above.

TEST RECORD SUMMARY:

The results of this investigation, including construction review and testing, indicate that the product evaluated complies with the applicable requirements in the standards noted below and, therefore, such product is judged eligible to bear UL's Mark as described on the Conclusion Page of this Report. Any information and documentation involving UL Mark services are provided on behalf of UL LLC (UL) or any authorized licensee of UL.

Standard	Title	Edition or Publication Date	Latest Revision Date
UL 1310	Class 2 Power Units	7th Edition	2018-03-09 (Issued date)
CAN/CSA C22.2 No. 223	Power Supplies with Extra-low Voltage Class 2 Outputs	3rd Edition	2017-06-01

CONCLUSION

Sample of the products covered by this Report has been found to comply with the requirements covering the category and the products are found to comply with UL's applicable requirements. The description and test result in this Report are only applicable to the sample(s) investigated by UL and does not signify UL Listing Mark or that the product(s) described are covered under UL's Follow-Up Service Program. When covered under UL's Follow-Up Service Program, the manufacturer is authorized to use the Listing Mark of UL on such products which comply with UL's Follow-Up Service Procedure and any other applicable requirements of UL LLC. The Listing Mark of UL on the product, or the UL symbol on the product and the Listing Mark of UL on the smallest unit container in which the product is packaged, is the only method to identify products investigated by UL to published requirements and manufactured under UL's Listing and Follow-Up Service.

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