

UL TEST REPORT AND PROCEDURE

Standard:	UL 60601-1, 1st Edition, 2006-04-26 (Medical Electrical Equipment, Part 1: General Requirements for Safety) CAN/CSA-C22.2 No. 601.1-M90, 2005 (Medical Electrical Equipment - Part 1: General Requirements for Safety)
Certification Type:	Component Recognition
CCN:	QQHM2, QQHM8 (Power Supplies, Medical and Dental)
Product:	AC-DC Adaptor
Model:	BP(a)040(b)(c)(d)(e) (a) can be A to Z for family related designs. (b) can be S for single. (c) can be 05, 09, 12, 15, 18, 24 or 48 for output voltage. (d) can be F or N or Q for input plug type. (e) can be 00 thru 99 for customer options, not related safety concerns. (a)ENB1040(b)(c)(d)(e)(f) (a) can be A to Z for family related designs. (b) can be A to Z for design revision changes. (c) can be 05, 09, 12, 15, 18, 24 or 48 for output voltage. (d) can be 00 thru 99 for standard output cord options. (e) can be F or N or Q for input plug type. (f) can be 00 thru 99 for customer options, not related safety concerns.
Rating:	Rated Input; 100-240Vac, 50-60Hz, 1.2 A. Rated Output; 5Vdc, 5.0A or 9Vdc, 4.0A or 12Vdc, 3.4A or 15Vdc, 2.7A or 18Vdc, 2.2A or 24Vdc, 1.7A or 48Vdc, 0.83A. Rated output voltage is designated in the model name designation system).
Applicant Name and Address:	BRIDGEPOWER CORP 964 GOSAEK-DONG GWONSEON-GU SUWON-SI GYEONGGI-DO 441-813 KOREA

This is to certify that representative samples of the products covered by this Test Report have been investigated in accordance with the above referenced Standards. The products have been found to comply with the requirements covering the category and the products are judged to be eligible for Follow-Up Service under the indicated Test Procedure. The manufacturer is authorized to use the UL Mark on such products which comply with this Test Report and any other applicable requirements of Underwriters Laboratories Inc. ('UL') in accordance with the Follow-Up Service Agreement. Only those products which properly bear the UL Mark are considered as being covered by UL's Follow-Up Service under the indicated Test Procedure.

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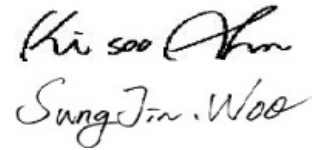
Issue Date: 2011-03-04

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Underwriters Laboratories Inc.
Reviewed by: KiSoo Ahn
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Handwritten signatures of KiSoo Ahn and Sung Jin Woo.

Supporting Documentation

The following documents located at the beginning of this Procedure supplement the requirements of this Test Report:

- A. Authorization - The Authorization page may include additional Factory Identification Code markings.
- B. Generic Inspection Instructions -
 - i. Part AC details important information which may be applicable to products covered by this Procedure. Products described in this Test Report must comply with any applicable items listed unless otherwise stated in the body of this Test Report.
 - ii. Part AE details any requirements which may be applicable to all products covered by this Procedure. Products described in this Test Report must comply with any applicable items listed unless otherwise stated in the body of each Test Report.
 - iii. Part AF details the requirements for the UL Certification Mark which is not controlled by the technical standard used to investigate these products. Products are permitted to bear only the Certification Mark(s) corresponding to the countries for which it is certified, as indicated in each Test Report.

Product Description

Switching type power supply, which electronic components are mounted on PWB and housed in plastic enclosure and provided with appliance inlet. In addition, some series of power supply are the direct plug-in units. See "model differences" for details.

Model Differences

- The BPM040 series is the basic model. Model (a)ENB1040 series is identical to the basic model series except for the model type designations.

- The marked models as 05, 09, 12, 15, 18, 24 and 48 on nomenclature are similar, except for Main transformer (T1) windings, output rating and minor secondary circuit options not affecting safety.

-For each plug-type configuration

F-Class I appliance inlet type: IEC60320-C14,

Q-Class II appliance inlet type: IEC60320-C18,

N-Class II appliance inlet type: IEC60320-C8.

Technical Considerations

- Classification of installation and use : Portable
- Supply connection : Appliance Inlet
- Accessories and detachable parts included in the evaluation : None
- Options included : None
- The product was investigated to the following additional standards:: EN 60601-1: 1990 + A1:1993 + A2:1995
- The product was not investigated to the following standards or clauses:: Clause 36, Electromagnetic Compatibility (IEC 60601-1-2), Clause 48, Biocompatibility (ISO 10993-1), Clause 52.1, Programmable Electronic Systems (IEC 60601-1-4)
- The product is Classified only to the following hazards:: Casualty, Fire, Shock
- The degree of protection against harmful ingress of water is:: Ordinary
- The mode of operation is:: Continuous
- Software is relied upon for meeting safety requirements related to mechanical, fire and shock:: No
- The product is suitable for use in the presence of a flammable anesthetics mixture with air or oxygen or with nitrous oxide:: No

Engineering Conditions of Acceptability




For use only in or with complete equipment where the acceptability of the combination is determined by Underwriters Laboratories Inc. When installed in an end-product, consideration must be given to the following:

- Unit has not been evaluated for use in or likely to be used in the patient vicinity.
- Instructions shall be considered in the end product application.
- Marking shall be considered in the end product application.
- Leakage current measurements shall be considered in the end-use product.
- Unit was evaluated for use in a 40° C ambient.

Additional Information

Max. Normal Load Condition: Rated output current

Markings and instructions

Clause Title	Marking or Instruction Details
Company identification	Classified or Recognized company's name, Trade name, Trademark or File
Model	Model number
Supply Connection	Voltage range, ac/dc, phases if more than single phase
Alternating current	
Supply Frequency	Rated frequency range in hertz
Power Input	Amps, VA, or Watts
Class II equipment	
Output	Rated output voltage, power, frequency.
Attention, consult accompanying documents	

Special Instructions to UL Representative

Samples specified as below shall be selected from current production or stock for the tests indicated. Product Name: BPMseries and MENB series, CCL Item: Transformer (T1), Dielectric Voltage Withstand: Primary lead to secondary lead with 4000 V ac for 1 min.

Production-Line Testing Requirements			
Test Exemptions - The following models are exempt from the indicated test			
Model	Grounding Continuity	Dielectric Voltage Withstand	Patient Circuit Dielectric Voltage Withstand
All models	Not Exempt	Not Exempt	Exempt
Solid-State Component Test Exemptions - The following solid-state components may be disconnected from the remainder of the circuitry during either Dielectric Voltage Withstand Test:			
N/A			
Sample and Test Specifics for Follow-Up Tests at UL			
The following tests shall be conducted in accordance with the Generic Inspection Instructions			
Model	Samples	Test	Test Details
N/A	N/A	N/A	N/A

TABLE: List of Critical Components

Object/part or Description	Manufacturer/ trademark	type/model	technical data	CCN	Marks of Conformity
Appliance Inlet (Class I)	Rong Feng Industrial Co., Ltd.	SS-120	Rated 15 A / 250 V.	AXUT2/8	USR/CNR
Appliance Inlet (Class II)	Rong Feng Industrial Co., Ltd.	RF-180	Rated 2.5 A / 250 V.	AXUT2/9	USR/CNR
Appliance Inlet (Class II) - Alternate	Rong Feng Industrial Co., Ltd.	SS-120A	Rated 15 A / 250 V.	AXUT2/8	USR/CNR
Enclosure(Fire/Mech./Elec.)	CHEIL INDUSTRIES.	HN-1064W(+)	Overall Sized approx. 102.0 by 60.0 by 32.5mm. Min 2.0mm thickness, V-1, RTI 80 degree C. Composed of two pieces, secured together by ultrasonic welding.	QMFZ2/8	USR/CNR
Fuse (F1)	Save fusetech Inc	SS-5	Rated 250V, T3.15AL	JDYX2/8	USR/CNR
Fuse (F1) - Alternate	LITTELFUSE WICKMANN WERKE	392	Rated 250V, T3.15AL	JDYX2/8	USR/CNR
Fuse (F1) - Alternate	Hollyland co., ltd.	5ET	Rated 250V, T3.15AL	JDYX2/8	USR/CNR
Fuse (F1) - Alternate	NIPPON SEISEN CABLE, LTD.	SLT	Rated 250V, T3.15AL	JDYX2/8	USR/CNR
Fuse (F2)	Save fusetech Inc	SS-5	Rated 250V, T3.15AL	JDYX2/8	USR/CNR
Fuse (F2) - Alternate	LITTELFUSE WICKMANN WERKE	392	Rated 250V, T3.15AL	JDYX2/8	USR/CNR
Fuse (F2) - Alternate	Hollyland co., ltd.	5ET	Rated 250V, T3.15AL	JDYX2/8	USR/CNR
Fuse (F2) - Alternate	NIPPON SEISEN CABLE, LTD.	SLT	Rated 250V, T3.15AL	JDYX2/8	USR/CNR
Varistor (ZNR4) (Optional)	Success Electronics	SVR14D471K	Rated 470 V, (line-to-line), Overall dimension 14 mm.	VZCA2/8	USR/CNR
Varistor (ZNR4) (Optional) - Alternate	AMOTECH CO LTD	INR14D471	Rated 470 V, (line-to-line), Overall dimension 14 mm.	VZCA2	USR
Varistor (ZNR4) (Optional) - Alternate	HONGZHI ENTERPRISES LTD	HEL14D471K	Rated 470 V, (line-to-line), Overall dimension 14 mm.	VZCA2	USR

Object/part or Description	Manufacturer/ trademark	type/model	technical data	CCN	Marks of Conformity
Thermistor (TH1)	Various	Various	NTC, 5 ohm or 10 ohm at 25 degree C	Tested in the equipment	-
Line Filter (LF1)	Bridgepower or Wendeng Jeil	3025634	Core: Ferrite, Coils: Polyurethane Enamelled Wire Min.130degree C. Bobbin: (QMFZ2) Bakelite, type PM9820@, V-0, 150 deg C	Tested in the equipment	-
X-capacitor (CX1) (Line to Line)	Carli	MPX	Rated 250V, Max.. 0.47 uF. Marked with X1 or X2. Meets IEC/EN60384-14.	FOWX2	USR/CNR
X-capacitor (CX1) (Line to Line) - Alternate	Iskra	KNB 1530 or 1562 or 1563	Rated 250V, Max.. 0.47 uF. Marked with X1 or X2. Meets IEC/EN60384-14.	FOWX2	USR/CNR
X-capacitor (CX1) (Line to Line) - Alternate	Pilkor	PCX2 335M or PCX2 337	Rated 250V, Max.. 0.47 uF. Marked with X1 or X2. Meets IEC/EN60384-14.	FOWX2	USR/CNR
X-capacitor (CX1) (Line to Line) - Alternate	Okaya	LE	Rated 250V, Max.. 0.47 uF. Marked with X1 or X2. Meets IEC/EN60384-14.	FOWX2	USR/CNR
X-capacitor (CX1) (Line to Line) - Alternate	Sunil	436D	Rated 250V, Max.. 0.47 uF. Marked with X1 or X2. Meets IEC/EN60384-14.	FOWX2	USR/CNR
X-capacitor (CX1) (Line to Line) - Alternate	Tenta	MEX	Rated 250V, Max.. 0.47 uF. Marked with X1 or X2. Meets IEC/EN60384-14.	FOWX2	USR/CNR
BridgeDiode(BD1)	Various	Various	Min. 4.0A, Min. 600V.	Tested in the equipment	-
Discharging Resister (PR1, PR2)	Various	Various	510Kohm 1/8W	Tested in the equipment	-
Electrolytic Capacitor (C1)	Various	Various	Max. 82 uF, Min. 400 V, min. 105 degree.	Tested in the equipment	-
Switching IC (U1)	Various	Various	Max 30V, Max.4mA	Tested in the equipment	-
FET (Q1)	Various	Various	Min 650V, Max.7.2A	Tested in the equipment	-
Main Transformer(T1) for output 5 V	Bridgepower or Wendeng Jeil	3025688001	JEC(B), Class B. Core: Ferrite, size 28 by 20 mm. Coils: TIW:Furukawa, TEXE, 130 deg C.Bobbin:(QMFZ2), V-0, 130 degC. see Enclosure for details.	Tested in the equipment	-

Object/part or Description	Manufacturer/ trademark	type/model	technical data	CCN	Marks of Conformity
Main Transformer(T1) for output 9V	Bridgepower or Wendeng Jeil	3025688002	JEC(B), Class B. Core: Ferrite, size 28 by 20 mm. Coils: TIW:Furukawa, TEXE, 130 deg C.Bobbin:(QMFZ2), V-0, 130 degC. see Enclosure for details.	Tested in the equipment	-
Main Transformer(T1) for output 12 V	Bridgepower or Wendeng Jeil	3025688003	JEC(B), Class B. Core: Ferrite, size 28 by 20 mm. Coils: TIW:Furukawa, TEXE, 130 deg C.Bobbin:(QMFZ2), V-0, 130 degC. see Enclosure for details.	Tested in the equipment	-
Main Transformer(T1) for output 15V	Bridgepower or Wendeng Jeil	3025688004	JEC(B), Class B. Core: Ferrite, size 28 by 20 mm. Coils: TIW:Furukawa, TEXE, 130 deg C.Bobbin:(QMFZ2), V-0, 130 degC. see Enclosure for details.	Tested in the equipment	-
Main Transformer(T1) for output 18 V	Bridgepower or Wendeng Jeil	3025688005	JEC(B), Class B. Core: Ferrite, size 28 by 20 mm. Coils: TIW:Furukawa, TEXE, 130 deg C.Bobbin:(QMFZ2), V-0, 130 degC. see Enclosure for details.	Tested in the equipment	-
Main Transformer(T1) for output 24 V	Bridgepower or Wendeng Jeil	3025688006	JEC(B), Class B. Core: Ferrite, size 28 by 20 mm. Coils: TIW:Furukawa, TEXE, 130 deg C.Bobbin:(QMFZ2), V-0, 130 degC. see Enclosure for details.	Tested in the equipment	-
Main Transformer(T1) for output 48 V	Bridgepower or Wendeng Jeil	3025688007	JEC(B), Class B. Core: Ferrite, size 28 by 20 mm. Coils: TIW:Furukawa, TEXE, 130 deg C.Bobbin:(QMFZ2), V-0, 130 degC. see Enclosure for details.	Tested in the equipment	-
Optical Isolator (U2)	Vishay Semiconductor	TCET1103(G)D or TCET1103	Double protection optical isolator. Providing isolation voltage 5000 Vac	FPQU2/8	USR/CNR
Optical isolator (U2) - Alternate	COSMO ELECTRONICS CORP	KP1010X	Double protection optical isolator. Providing isolation voltage 5000 Vac	FPQU2/8	USR/CNR
Optical isolator (U2) - Alternate	SHARP CORP ELECTRONIC COMPONENTS	PC123	Double protection optical isolator. Providing isolation voltage 5000 Vac	FPQU2	US

Object/part or Description	Manufacturer/ trademark	type/model	technical data	CCN	Marks of Conformity
	GROUP				
Optical isolator (U2) - Alternat	LITE-ON TECHNOLOGY CORP	LTV-817	Double protection optical isolator. Providing isolation voltage 5000 Vac	FPQU2/8	USR/CNR
Optical isolator (U2) - Alternate	KODENSHI KOREA	PC-17K	Double protection optical isolator. Providing isolation voltage 5000 Vac.	FPQU2/8	USR/CNR
Bridging Capacitor (CY1, CY2)	SUCCESS ELECTRONICS CO LTD	SE & CB	250Vmin, 1000 pF. Marked with Y1 & Y2.	FOWX2	USR
PWB	Various	Various	Min. V-1, min 130°C.	ZPMV2	USR
Heatsink(HS1)-Primary	Various	Various	Metal, overall sized approx. 54 by 22 mm, 2 mm thickness. Wound by polyester film tape OANZ2), Min. 130 deg C,	Tested in the equipment	-
Heatsink(HS2)-Secondary	Various	Various	Metal, overall sized approx. 35 by 22 mm, 2 mm thickness. Wound by polyester film tape OANZ2), Min. 130 deg C,	Tested in the equipment	-
Output cable(LPS)	Various	Various	For use of external interconnection, max 3.05 m long, max. 300 V, 80 °C, min.20 AWG, Marked with VW-1 or FT-1.	AVLV2 or ZJCZ	USR
Nameplate Label	BETHEL	BG-1000	Suitable for use on surface of Polycarbonate (PC) with max. 60 °C surface temperature.	PGDQ2, PGAA	USR
Bonding Glue	Various	Various	Min. V-2, min. 100 °C for additional secureness of internal conductor.	QMFZ2	USR
Wiring, internal (Primary)	Various	Various	Max. 300 V, 80 °C, min.20 AWG, Marked with VW-1 or FT-1.	AVLV2	USR
Bonding conductor	Various	Various	Mechanically clamped or secured on PWB from Appliance Inlet. Min 18 AWG, Green-and-Yellow Insulation.	AVLV2	USR

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Enclosures

<u>Type</u>	<u>Supplement Id</u>	<u>Description</u>
Collateral		
Particular		
Photographs	3-45	External view of F-Class I appliance inlet type: IEC60320-C14.
Photographs	3-46	External view of N-Class II appliance inlet type: IEC60320-C8.
Photographs	3-47	External view of Q-Class II appliance inlet type: IEC60320-C18.
Diagrams		
Schematics + PWB	5-06	Circuit Diagram
Schematics + PWB	5-07	PWB Pattern
Manuals		
Miscellaneous	7-02	T1 transformer Spec(For 5Vdc output)
Miscellaneous	7-09	T1 transformer Spec(For 9Vdc output)
Miscellaneous	7-10	T1 transformer Spec(For 12Vdc output)
Miscellaneous	7-11	T1 transformer Spec(For 15Vdc output)
Miscellaneous	7-12	T1 transformer Spec(For 18Vdc output)
Miscellaneous	7-13	T1 transformer Spec(For 24Vdc output)
Miscellaneous	7-14	T1 transformer Spec(For 48Vdc output)
Miscellaneous	7-16	Enclosure drawing
Miscellaneous	7-34	Marking plate