

UL TEST REPORT AND PROCEDURE

Standard:	UL 62368-1, 2nd Ed, 2014-12-01 (Audio/video, information and communication technology equipment Part 1: Safety requirements) CSA C22.2 No. 62368-1-14, 2nd Ed., Issue Date: 2014-12-01 (Audio/video, information and communication technology equipment Part 1: Safety requirements)
Certification Type:	Component Recognition
CCN:	QQJQ2, QQJQ8 (Power Supplies for Use in Audio/Video, Information and Communication Technology Equipment)
Complementary CCN:	N/A
Product:	Switching Power Supply
Model:	HPA1K5PSXX Where XX can be 24, 36, 48, or 60 which represents rated output voltage. May also be provided with additional suffix "SF" or "-M".
Rating:	<p>INPUT: 100 - 180Vac 16A 50/60Hz 180 - 240Vac 10A 50/60Hz</p> <p>OUTPUT V1 : Model HPA1K5PS24: 24Vdc (0-24), 62.5 A, 1500 W (for Input rated: 180-240 Vac) 1400 W (for Input rated: 100-180 Vac)</p> <p>Model HPA1K5PS36: 36Vdc (0-36), 41.7 A Max, 1500 W (for Input rated: 180-240 Vac) 1400 W (for Input rated: 100-180 Vac)</p> <p>Model HPA1K5PS48: 48Vdc (0-48), 31 A Max, 1500 W (for Input rated: 180-240 Vac) 1400 W (for Input rated: 100-180 Vac)</p> <p>Model HPA1K5PS60: 60Vdc (0-60), 25 A Max, 1500 W (for Input rated: 180-240 Vac) 1400 W (for Input rated: 100-180 Vac)</p> <p>All models: Output V2 Standby: 5Vdc, 2A</p>

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Report Reference #

E139109-A6093-UL

Applicant Name and Address:

XP POWER L L C
340 COMMERCE, SUITE 100
IRVINE CA 92602
UNITED STATES

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

The applicant is authorized to reproduce the referenced Test Report provided it is reproduced in its entirety.

UL authorizes the applicant to reproduce the latest pages of the referenced Test Report consisting of the first page of the Specific Technical Criteria through to the end of the Conditions of Acceptability.

Any information and documentation involving UL Mark services are provided on behalf of UL LLC (UL) or any authorized licensee of UL.

Prepared By: Joyce Liang / Project Handler

Reviewed By: Lorenzo Iorio / Reviewer

Supporting Documentation

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

A. Authorization - The Authorization page may include additional Factory Identification Code markings.

B. Generic Inspection Instructions -

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

Product Description

The product is a component AC-DC power supply for building-in, provided with an overall metal enclosure, incorporating primary and SELV components.

The main PWB is secured to the chassis bottom by multiple machine screws. An insulating sheet is installed between PWB and chassis, wrapped around the board assembly, covering the sides and extending over the top. The control PWB is mounted vertically on the side of the main PWB and secured by multi-pin soldering.

The unit is provided with 2 cooling fans mounted internally behind the rear panel acting as fan guard.

Model Differences

The power supplies in the series are differentiated by the output voltage and current ratings, number of turns of primary/secondary windings in the Transformers (T101 (Power)) and minor differences in the secondary circuit components and PWB layout.

See below for Model Ratings Table Below:

OUTPUT V1 :

Model HPA1K5PS24: Output Rated: 24Vdc (0-24 Vdc), 58.3 A (1400 W for Input rated: 100-180 Vac)

Model HPA1K5PS24: Output Rated: 24Vdc (0-24 Vdc), 62.5 A Max (1500 W for Input rated: 180-240 Vac)

Model HPA1K5PS36: Output Rated: 36Vdc (0-36 Vdc), 41.7 A (1400 W for Input rated: 100-180 Vac)

Model HPA1K5PS36: Output Rated: 36Vdc (0-36V dc), 41.7 A (1500 W for Input rated: 180-240 Vac)

Model HPA1K5PS48: Output Rated: 48Vdc (0-48 Vdc), 29.2 A (1400 W for Input rated: 100-180 Vac)

Model HPA1K5PS48: Output Rated: 48Vdc (0-48 Vdc), 31 A (1500 W for Input rated: 180-240 Vac)

Model HPA1K5PS60: Output Rated: 60Vdc (0-60 Vdc), 25 A (1400 W for Input rated: 100-180 Vac)

Model HPA1K5PS60: Output Rated: 60Vdc (0-60 Vdc), 25 A (1500 W for Input rated: 180-240 Vac)

All models: Output V2 Standby: 5Vdc, 2A

All models rated 100% rated load at 50°C, 75% rated load at 60°C, 50% rated load at 70°C.

Suffix "SF" indicates single fuse provided in the line side of the primary.

Suffix "-M" is identical to HPU1K5PSXX except for model designation for marketing purposes.

Test Item Particulars

Classification of use by	Ordinary person
Supply Connection	AC Mains
Supply % Tolerance	+10%/-10%
Supply Connection – Type	For building-in
Considered current rating of protective device as part of building or equipment installation	20 A; building;
Equipment mobility	for building-in
Over voltage category (OVC)	OVC II
Class of equipment	Class I
Access location	N/A
Pollution degree (PD)	PD 2
Manufacturer's specified maximum operating ambient (°C)	See Model Differences section.
IP protection class	IPX0
Power Systems	TN IT - 230 V L-L
Altitude during operation (m)	5000 m
Altitude of test laboratory (m)	17 m
Mass of equipment (kg)	3.5

Technical Considerations

- The product was submitted and evaluated for use at the maximum ambient temperature (Tma) permitted by the manufacturer's specification of : See Model Differences section.
- The product is intended for use on the following power systems : TN, IT (230 V L-L)
- Considered current rating of protective device as part of the building installation (A) : 20
- Mains supply tolerance (%) or absolute mains supply values : +10%/-10%
- The equipment disconnect device is considered to be : To be determined in the end-product.
- The following were investigated as part of the protective earthing/bonding : Printed wiring board trace (see Enclosure - Miscellaneous 07-02 for details)
- Required Clearances have been adjusted by multiplying the clearance at sea level by a factor of 1.48 for operating at an altitude of 5000 meters. If the calculated Clearance exceeded the Creepage, the Creepage was adjusted to the value of clearance.

Engineering Conditions of Acceptability

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

- The following product-line tests are conducted for this product : Electric Strength
- The following output circuits are at ES1 energy levels : All Outputs
- The following output circuits are at PS2 energy levels : 5Vsb
- The following output circuits are at PS3 energy levels : All Outputs
- The maximum investigated branch circuit rating is : 20 A
- The investigated Pollution Degree is : 2
- Proper bonding to the end-product main protective earthing termination is : Required (Class I)
- An investigation of the protective bonding terminals has : been conducted
- The following input terminals/connectors must be connected to the end-product supply neutral : AC N
- The following end-product enclosures are required : Mechanical, Fire, Electrical
- The following magnetic devices (e.g. transformers or inductor) are provided with an OBJY2 insulation system with the indicated rating greater than Class A (105°C) : T101 (Power), T100 (Driver), T3 (Bias), T1, T2 (Current) are Class F (155°C).
- The power supply was evaluated to be used at altitudes up to : "5000 m"
- When installed in a Class I end product, the power supply shall be mounted in a manner that provides the minimum required Clearance between the primary side of power supply and protectively earthed accessible conductive parts.
- A suitable main disconnect device shall be provided in the end product.
- For models without suffix "SF": The power supplies covered by this report have a fuse in the neutral of the primary circuit. The need for a marking to warn a service person of the hazards associated with double pole/neutral fusing shall be considered in the end product.
- Consideration to repeating the "Prospective Touch Voltage and Touch Current Test" should be given in the end-product evaluation.
- The power supplies in this report have been subject to Capacitance Discharge testing. Additionally, all associated component safeguards have been assessed to the applicable requirement in Annex G.10. Additional testing should not be needed if directly connected to mains e.g. using an appliance inlet, wiring terminals, etc.

Additional Information

Marking Plate is representative of all models.

Technical Amendment #1:

- Limited testing was conducted to add alternate construction models HPA1K5PS36 and HPA1K5PS60.

- Updated the Summary of Compliance with National Differences field.

- Updated list of critical components to include the following changes and addition:

1) Revised technical data of Electrolytic Capacitor (C16, C17, C18, C55, C56, C57, C58, C59, C39, C40) to include Rated 680uF/ 50V (36-V model) and 220uF/100V (60-V model).

2) Added Diode, Schottky (D131, D132), Diode, Schottky (D133, D134) and Electrolytic Capacitor (C121, C122, C124, C125, C126, C127, C128, C123) – (SEC).

3) Included additional diagrams information of Transformer, Output (T101), Supplements Ids 04-16 and 04-17.

- Enclosed Diagrams of T101-36 and T01-60, Supplement Ids 04-16 and 04-17.

The following tests were selected as representative of the test program applicable to the models covered by this CBTR: Electric Strength Test (5.4.9). This test has been witnessed for models selected as representative of the product family covered by this report and of the applicable test program.

Technical Amendment #2:

This is to add alternate Cooling Fans Model XYW03828012BS-EAK-12 from YS Tech. No testing was considered necessary due to the alternate fan Model XYW03828012BS-EAK-12 has the same CFM as the original fan Model XYW03828012BS-EAH also from YS Tech. Changes were made to the Critical Components Table. Also in this Amendment, address of the applicant and manufacturer and summary of compliance section on EU Special National Conditions were updated.

Additional Standards

The product fulfills the requirements of: EN 62368-1:2014+A11:2017, AS/NZS 62368.1:2018, J62368-1 (2020), CSA/UL 62368-1:2014

Markings and Instructions

Clause Title	Marking or Instruction Details
Equipment identification marking – Manufacturer identification	Listee's or Recognized company's name, Trade Name, Trademark or File Number
Equipment identification marking – model identification	Model Number
Equipment rating marking – ratings	
DVK, F.3.5.3-Warning to service personnel	Only for models without suffix "SF". "CAUTION: Double pole, neutral fusing. Disconnect mains before servicing." "/"ATTENTION. Double pôle/fusible sur le neutre. Débrancher l'alimentation avant l'entretien."

Special Instructions to UL Representative

Inspect the transformer(s) listed in production-line testing requirements per AA1.1- (C). When the tests are conducted at other location, inspect test record and specification sheet provided by the component manufacturer. Verify the specification sheet indicates 100% routine test specified in BD1.1 is conducted at the component manufacturer. The test record noted above shall be submitted to the manufacturer from transformer manufacturer. The test record can be in the form of a actual test record. A stamp or sticker on the transformer or other method verifying the routine test is being completed on 100% production is also acceptable.

BD1.0	TABLE: Production-Line Testing Requirements					
BD1.1	Electric Strength Test Special Constructions – Refer to Generic Inspection Instructions, Part AC for further information.					
Model	Component	Removable parts	Test probe location	Test V rms	Test V dc	Test Time, s
All models	Complete unit	--	Primary to Secondary	2800	4000	1
All models	Complete unit	--	Primary to Chassis	1800	2500	1
BD1.2	Earthing Continuity Test Exemptions – This test is not required for the following models:					
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BD1.3	Electric Strength Test Exemptions – This test is not required for the following models:					
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BD1.4	Electric Strength Test Component Exemptions – The following solid-state components may be disconnected from the remainder of the circuitry during the performance of this test.					
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BE1.0	Sample and Test Specifics for Follow-Up Tests at UL				
Model	Component	Material	Test	Sample (s)	Test Specifics
-	-	-	-	-	-