

## UL TEST REPORT AND PROCEDURE

<b>Standard:</b>	UL 62368-1, 2nd Ed, 2014-12-01 (Audio/video, information and communication technology equipment Part 1: Safety requirements) CAN/CSA C22.2 No. 62368-1-14, 2nd Ed (Audio/video, information and communication technology equipment Part 1: Safety requirements)
<b>Certification Type:</b>	Component Recognition
<b>CCN:</b>	QQJQ2, QQJQ8 (Power Supplies for Use in Audio/Video, Information and Communication Technology Equipment)
<b>Complementary CCN:</b>	QQGQ2, QQGQ8 (Power Supplies for Information Technology Equipment Including Electrical Business Equipment)
<b>Product:</b>	AC-DC Power Supply
<b>Model:</b>	HPT5K0TSXXX Series, where X can be 0 to 9 which represents rated output voltage.
<b>Rating:</b>	Input: 3-Phase (3W+PE), 50/60 Hz 200-240V, 10A MAX/PHASE, 3000W MAX 380-480V, 10A MAX/PHASE, 5000W MAX  Output: See Model Differences for Output Ratings per each Model.
<b>Applicant Name and Address:</b>	XP POWER L L C 15641 RED HILL AVE, SUITE 100 TUSTIN CA 92780 UNITED STATES

Issue Date: 2018-03-23

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Report Reference #

E139109-A6006-UL

Revision Date: 2019-09-26

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: Robert Leon / Project Handler

Reviewed By: Walid Beytoughan / 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 equipment is a 3-Phase (3W+PE) AC to DC isolating power supply for building-in. The power supply with up to a 5000 watt rated output is provided with a metal enclosure housing and several PWBs with various critical components intended for use in Information Technology Equipment. The main outputs are considered ES3 and PS3 circuits. The 5Vsb auxiliary output is an isolated output for control and monitoring of the equipment's operation and is considered a ES1 and PS1 circuit.

### Model Differences

All models provided within the series are identical with the exception of the output rating, mains transformer windings and minor secondary components.

Output Rating:

At 200-240Vac Input:

HPT5K0TS048: 0-48Vdc/62.5A Max, Max. 3000W

HPT5K0TS060: 0-63Vdc/50A Max, Max. 3000W

HPT5K0TS100: 0-105Vdc/30A Max, Max. 3000W

HPT5K0TS200: 0-210Vdc/15A Max, Max. 3000W

At 380-480Vac Input:

HPT5K0TS048: 0-48Vdc/104.17A Max, Max. 5000W

HPT5K0TS060: 0-63Vdc/83.33A Max, Max. 5000W

HPT5K0TS100: 0-105Vdc/50A Max, Max. 5000W

HPT5K0TS200: 0-210Vdc/25A Max, Max. 5000W

All Models are provided with an isolated 5Vsb/2A output.

### Test Item Particulars

Classification of use by	Instructed 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	30 A; building;
Equipment mobility	for building-in
Over voltage category (OVC)	OVC II OVC II
Class of equipment	Class I
Access location	N/A
Pollution degree (PD)	PD 2
Manufacturer's specified maximum operating ambient (°C)	The product was submitted and evaluated for use at the maximum ambient temperature (Tma) permitted by the manufacturer's specification of: 50°C for 100% load and 70°C for 50%load.
IP protection class	IPX0
Power Systems	TN
Altitude during operation (m)	5000 m
Altitude of test laboratory (m)	17 m
Mass of equipment (kg)	5.5kg

#### Technical Considerations

- The product was submitted and evaluated for use at the maximum ambient temperature (Tma) permitted by the manufacturer's specification of : The product was submitted and evaluated for use at the maximum ambient temperature (Tma) permitted by the manufacturer's specification of: 50°C for 100% load and 70°C at 50% load.
- The product is intended for use on the following power systems : TN
- Considered current rating of protective device as part of the building installation (A) : 30
- Mains supply tolerance (%) or absolute mains supply values : +10%/-10%
- The equipment disconnect device is considered to be : N/A
- According to IEC60664-1, Table A2, 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 for all countries. The correction factor is based on barometric pressure of 70kPa and Overvoltage Category II. If the calculated Clearance exceeded the Creepage, the Creepage was adjusted to the value of clearance. No other additional requirements were considered at this time as they are not explicitly addressed in UL/IEC 60950-1.
- The internal wiring is certified Appliance Wiring Material rated VW-1 and/or FT-1 which were considered equivalent to the tests of IEC60332-1-2 and IEC60332-1-3. The final acceptability of the internal wiring may be determined under the discretion of the receiving NCB.

#### 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 : Earthing Continuity and Electric Strength
- The following output circuits are at ES1 energy levels : 5Vsb and 48Vdc
- The following output circuits are at ES3 energy levels : 60Vdc, 100Vdc, 200Vdc
- The following output circuits are at PS1 energy levels : 5Vsb
- The following output circuits are at PS3 energy levels : 48Vdc, 60Vdc, 100Vdc, 200Vdc
- The maximum investigated branch circuit rating is : 30 A
- The investigated Pollution Degree is : 2
- The following end-product enclosures are required : Mechanical, Electrical, Fire
- The following magnetic devices (e.g. transformers or inductor) are provided with an OBJ2 insulation system with the indicated rating greater than Class A (105°C) : T101, T102, T103, T104, T106 Class F (155)
- The equipment is suitable for direct connection to : AC mains supply
- The power supply was evaluated to be used at altitudes up to : "5,000 m"
- The end-product Electric Strength (ES) Test is to be based upon a Mains Transient Voltage of 4000Vpk as shown in Table 13, OVII, 600V Mains, applying footnote (a) for 480Vrms (line - line) mains. ES test values for basic is 4000Vdc and for reinforced is 6000Vdc.
- The fan provided in this sub-assembly is provided with a fan guard that is integral to the chassis to reduce the risk of operator contact with the stator.
- An investigation of the protective earthing connection has been conducted. All units must be connected directly to the building mains protective earthing connection.
- These component power supplies employ VDRs connected to ground in series with a GDT. The GDT was not evaluated for basic insulation. They are to be installed within an end-product which will be installed within a rack system. Permanent connection to earth is guaranteed by means of the overall rack configuration and the Pluggable Type B power distribution unit (PDU) which powers the individual sub-components within the rack.

#### Additional Information

Component licenses provided may be older than 3 years old. Manufacturer to provide updated license upon request.

Nameplate markings provided were considered representative of the entire series. Testing of the marking label for durability was conducted previously for this manufacturer as part of CBTR E139109-A141, CBTC US-24246-UL.

The following changes were made to the report:  
Corrected CTF3 Client Testing Location address.

Corrected Condition of Acceptability regarding the Electric Strength Test being based on the Mains Transient Voltage of 4000Vpk.

Corrected subclause 5.4.2.3 a) to 4000V for all AC Input (Line to Line) and add statement "This power supply does not use a Neutral Conductor therefore per Table 13 (a) the line to line maximum rated voltages of 480Vrms and 679Vpk are the maximum working voltages."

Corrected referenced subclause no. to 5.7 for Touch Current Measurements under "Notes" for Table 5.7.2.2, 5.7.4.

Corrected Table 5.4.2.2 based on revised working voltages of 480Vrms and 679Vpk.

Added note to Table 5.4.2.3 stating "Required Withstand Voltage is equal to the Transient Voltage from Table 13."

Added note to Table 5.4.4.2 stating "Peak voltages were measured while connected to a mains voltage of 480Vrms."

Corrected "Approved by" Signature.

Added Input Test results for 180-264 V which was missed from previous evaluation.

**Amendment (Technical)**

1. Revised output voltage range.
2. Added three alternate Bleeder Resistors (R1, R2, R3, R4, R5, R6) - HVR Series, WF25N Series, FVS25 Series to table 4.1.2.
3. Added new Optional Y-Capacitor (C55) to table 4.1.2.
4. Added alternate Top PWB and Driver PWB Layouts and Schematics to Enclosures (5-11, 5-12, 5-13)
5. Updated Test Tables 5.5.2.2 and 5.7.2.2.

**Corrections:**

1. Corrected Signatures
2. Revised Table 4.1.2 - End Fan maximum input voltage and current rating. No testing was necessary since the maximum CFM rating has not changed.


**Amendment (Technical):**

Added new Model HPT5K0TS048.  
 Added test results for new model to related test tables.  
 Revised electrical ratings to include the new model.  
 Added Alternate PWB layouts as Enclosures 5-11, 5-12, 5-13.

**Additional Standards**

The product fulfills the requirements of: EN 62368-1:2014, UL 62368-1 2nd Ed, Issued December 1, 2014, CSA CAN/CSA-C22.2 NO. 62368-1 2nd Ed, Issued December 1, 2014, UL 60950-1, 2nd Ed, Revised May 9, 2019, CSA CAN/CSA-C22.2 NO. 60950-1 2nd Ed, Revised October 14, 2014

**Markings and Instructions**

Clause Title	Marking or Instruction Details
Equipment identification marking – Manufacturer identification	Listees or Recognized companys name, Trade Name, Trademark or File Number
Equipment identification marking – model identification	Model Number
Equipment rating marking – ratings	"Input Ratings (voltage, frequency/dc, current/power)", "Output Ratings (voltage, frequency/dc, current/power)"
Fuses – replaceable by skilled person	F1, F2, F3, Ratings "16A, 500V", located on or adjacent to fuse or in service manual.
Class I equipment -Terminal for main protective earthing	Provided adjacent to the main protective earthing terminal  (IEC 60417-5019)

**Special Instructions to UL Representative**

N/A

<b>BD1.0</b>	<b>TABLE: Production-Line Testing Requirements</b>					
<b>BD1.1</b>	<b>Electric Strength Test Special Constructions – Refer to Generic Inspection Instructions, Part AC for further information.</b>					
Model	Component	Removable parts	Test probe location	Test V rms	Test V dc	Test Time, s
HPT5K0TSX XX Series	T101, T102, T103, T104, T600	N/A	Primary/Chassis	2800	4000	1
HPT5K0TSX XX Series	T101, T102, T103, T104, T600	N/A	Primary/Secondary	4200	6000	1
<b>BD1.2</b>	<b>Earthing Continuity Test Exemptions – This test is not required for the following models:</b>					
	-					
<b>BD1.3</b>	<b>Electric Strength Test Exemptions – This test is not required for the following models:</b>					
	-					
<b>BD1.4</b>	<b>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.</b>					
	GT1, GT2					

<b>BE1.0</b>	<b>Sample and Test Specifics for Follow-Up Tests at UL</b>				
Model	Component	Material	Test	Sample (s)	Test Specifics
-	-	-	-	-	-